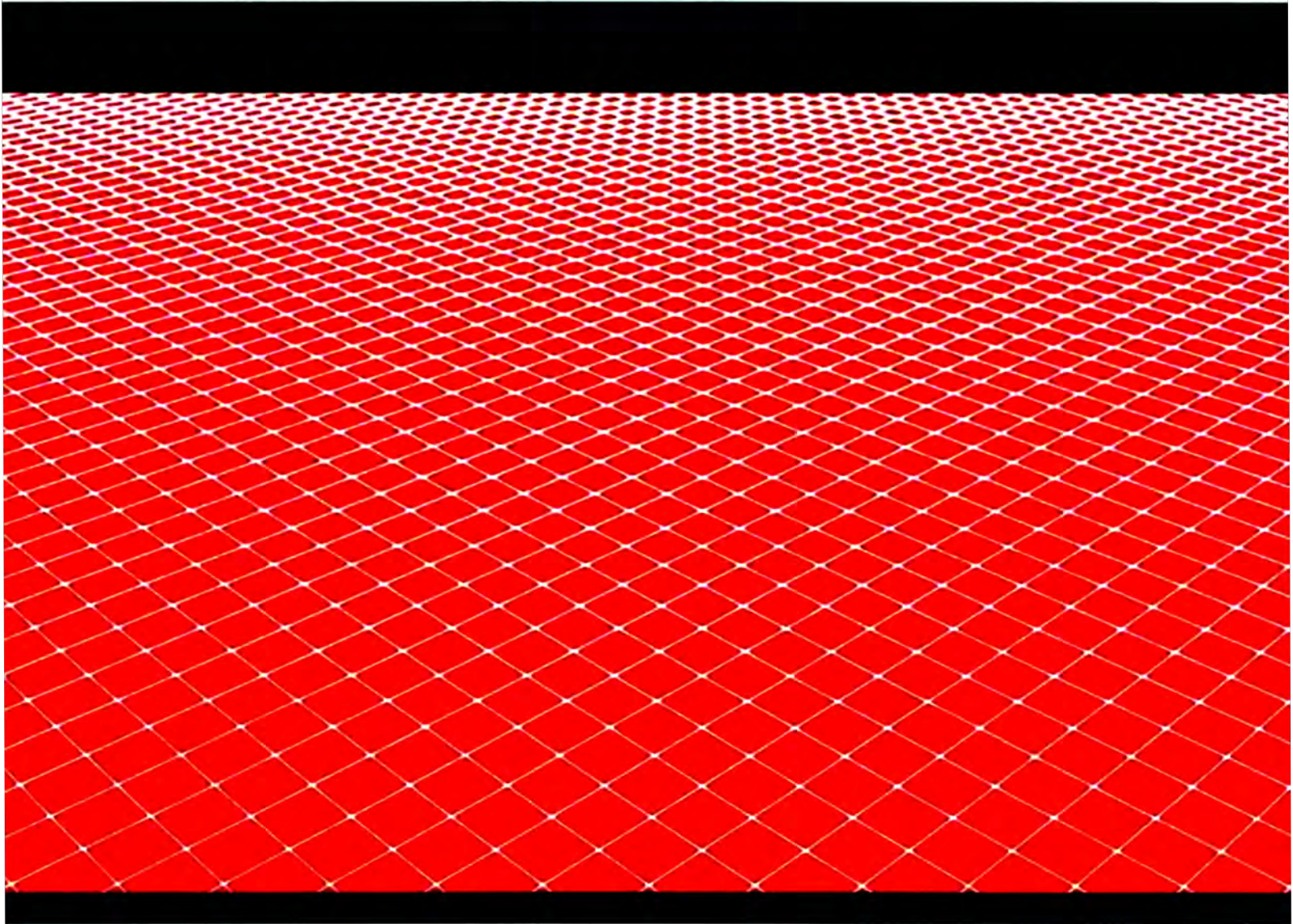




SHOP MANUAL

CB1300



TYPE CODE

- Throughout this manual, the following abbreviations are used to identify individual model.

CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES
E	U.K. (Ireland)
F	France
U	Australia

A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts—wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

⚠ WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.












⚠ WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1)
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent. Example: Molykote® BR-2 plus manufactured by Dow Corning U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent. Example: Molykote® G-n Paste manufactured by Dow Corning U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a middle strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use Fork or Suspension Fluid.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CB1300F.

Follow the Maintenance Schedule (Section 4) recommendations to ensure that the vehicle is in peak operating condition.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1, 3 and 4 apply to the whole motorcycle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Section 5 through 20 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedure.

If you are not familiar with this motorcycle, read Technical Feature in Section 2.

If you don't know the source of the trouble, go to section 22 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle.

You must use your own good judgement.

You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol ! and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

! DANGER

You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

! WARNING

You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

! CAUTION

You CAN be HURT if you don't follow instructions.

- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. Honda Motor Co., Ltd. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda MOTORCYCLES, MOTOR SCOOTERS OR ATVS.

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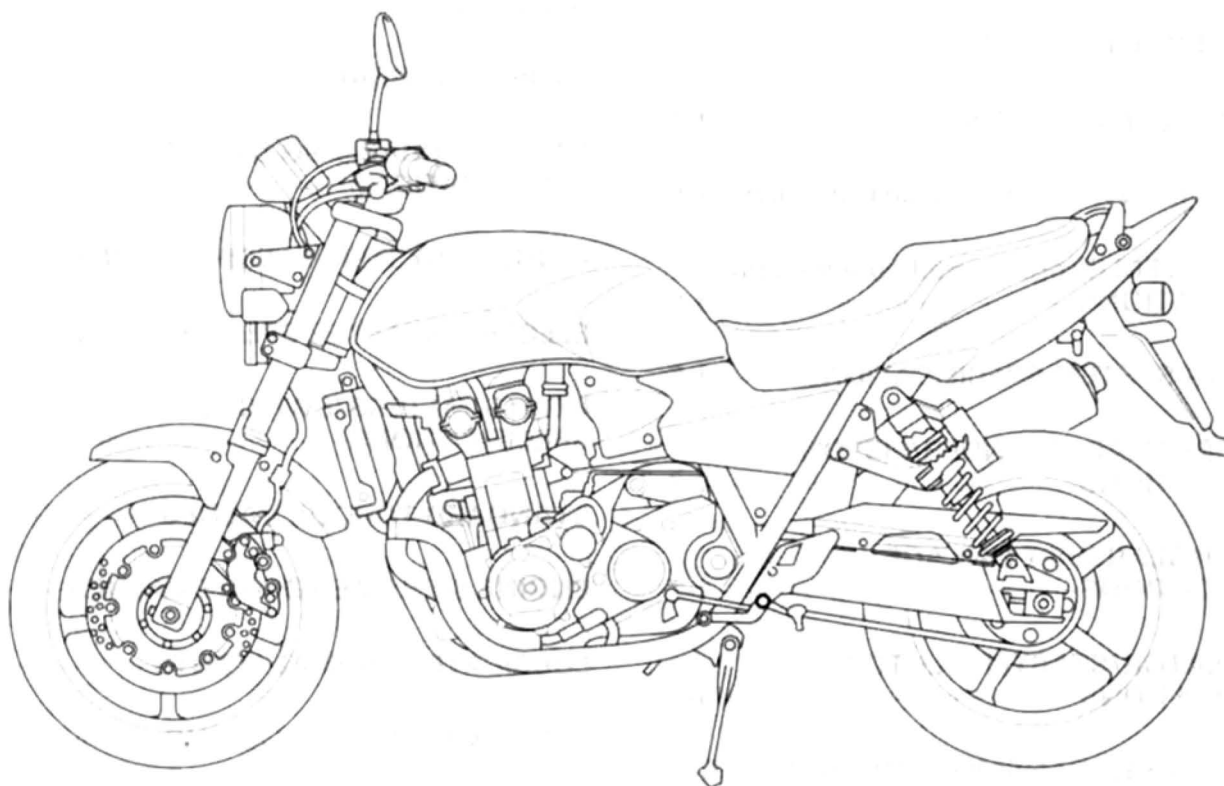
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GENERAL INFORMATION

SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show in the Cable and Harness Routing (page 1-23).

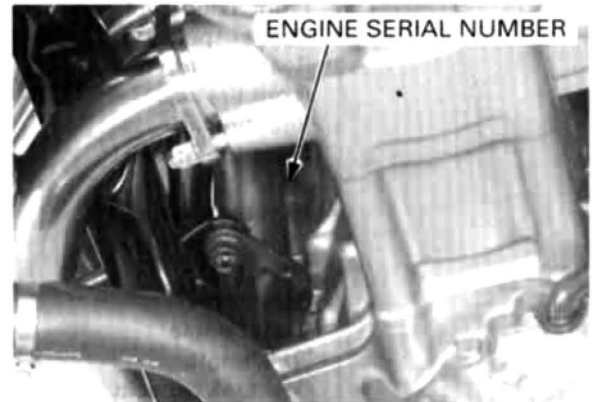
MODEL IDENTIFICATION



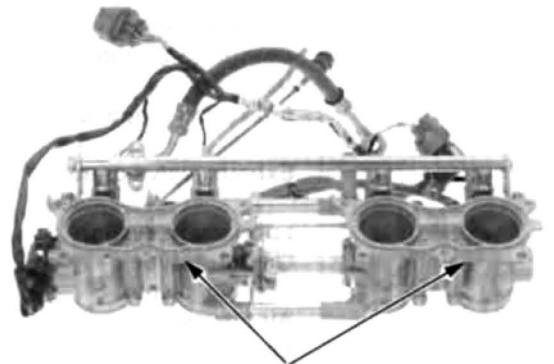
The frame serial number is stamped on the right side of the steering head.



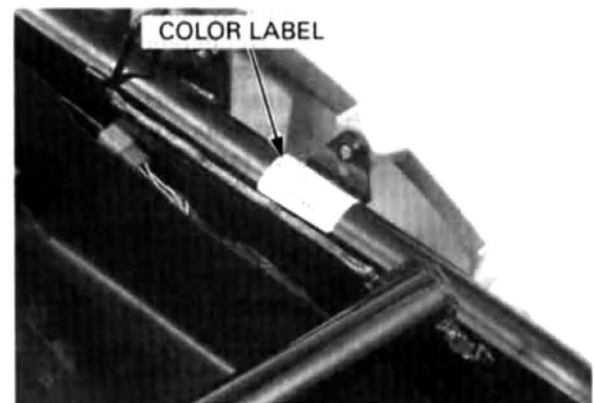
The engine serial number is stamped on the front side of the lower crankcase.



The throttle body identification number is stamped on the intake side of the throttle body as shown.



The color label is attached as shown. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS

1-4

	ITEM	SPECIFICATIONS
ELECTRICAL	Ignition system	Computer-controlled digital transistorized with electric advance
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted/triple phase, full wave rectification
	Lighting system	Battery

LUBRICATION SYSTEM SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.7 liter (3.9 US qt, 3.3 Imp qt)	–
	After draining/filter change	3.9 liter (4.1 US qt, 3.4 Imp qt)	–
	After disassembly	4.8 liter (5.1 US qt, 4.2 Imp qt)	–
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch		490 - 588 kPa (5.0 - 6.0 kgf/cm ² , 71 - 85 psi) at 5,000 min ⁻¹ (rpm)/(80°C/176°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.22 (0.006 - 0.009)	0.35 (0.014)
	Side clearance	0.02 - 0.07 (0.001 - 0.003)	0.10 (0.004)

FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ36A
Starter valve vacuum difference	20 mm Hg
Base throttle valve for synchronization	No.1
Idle speed	1,000 ± 100 min ⁻¹ (rpm)
Throttle grip free play	2 - 4 mm (1/16 - 3/16 in)
Intake air temperature sensor resistance (at 20°C/68°F)	1 - 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)	2.3 - 2.6 kΩ
Fuel injection resistance (at 20°C/68°F)	10.5 - 14.5 Ω
PAIR solenoid valve resistance (at 20°C/68°F)	20 - 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Manifold absolute pressure at idle	150 - 250 mm Hg
Fuel pressure at idle	343 kPa (3.5 kgf/cm ² , 50 psi)
Fuel pump flow (at 12V)	188 cm ³ (6.4 US oz, 6.6 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Coolant capacity	Radiator and engine
	2.74 liter (2.90 US qt, 2.41 Imp qt)
Radiator cap relief pressure	Reserve tank
	0.31 liter (0.33 US qt, 0.27 Imp qt)
108 - 137 kPa (1.1 - 1.4 kgf/cm ² , 16 - 20 psi)	
Thermostat	Begin to open
	80 - 84 °C (176 - 183 °F)
	Fully open
Recommended antifreeze	95 °C (203 °F)
	8 mm (0.3 in) minimum
High quality ethylene glycol antifreeze containing corrosion protection inhibitors	
50% mixture with soft water	
Standard coolant concentration	

CYLINDER HEAD/CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,324 kPa (13.5 kgf/cm ² , 192 psi) at 240 min ⁻¹ (rpm)	—
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.22 ± 0.03 (0.009 ± 0.001)	—
Camshaft	Cam lobe height	IN	37.54 – 37.78 (1.4779 – 1.4874)	37.50 (1.476)
		EX	37.40 – 37.64 (1.4724 – 1.4818)	37.36 (1.471)
	Runout	—		0.05 (0.002)
Oil clearance		0.030 – 0.072 (0.0012 – 0.0028)		0.10 (0.004)
Valve lifter	Valve lifter O.D.		25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.		26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.025 – 0.052 (0.0010 – 0.0020)	—
	Valve guide projection above cylinder head	IN	15.6 – 15.8 (0.61 – 0.62)	—
		EX	15.6 – 15.8 (0.61 – 0.62)	—
	Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)
Valve spring free length		IN	44.85 (1.766)	43.95 (1.730)
		EX	44.85 (1.766)	43.95 (1.730)
Cylinder head warpage			—	0.10 (0.004)
Piston, piston rings	Piston O.D. at 15 (0.6) from bottom		77.970 – 77.990 (3.0697 – 3.0705)	77.87 (3.066)
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.06 (0.750)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.98 (0.747)
	Piston -to piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.58 (0.023)
		Sec- ond	0.32 – 0.47 (0.013 – 0.019)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.026)	0.85 (0.033)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)
		Sec- ond	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)
Cylinder	I.D.		78.000 – 78.015 (3.0709 – 3.0715)	78.10 (3.075)
	Out of round		—	0.05 (0.002)
	Taper		—	0.05 (0.002)
	Warpage		—	0.05 (0.002)
Cylinder-to piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	—
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	—

CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		Honda DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	12.7 (0.50)	
Clutch	Spring free length	61.53 (2.422)	60.3 (2.37)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide	I.D.	27.995 – 28.012 (1.1022 – 1.1028)	28.08 (1.106)
	O.D.	39.992 – 40.008 (1.5745 – 1.5751)	39.93 (1.572)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.10 (1.067)

GENERAL INFORMATION**ALTERNATOR/STARTER CLUTCH SPECIFICATIONS**

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.684 (2.0348)

CRANKSHAFT/TRANSMISSION/BALANCER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.08 (0.003)
	Main journal bearing oil clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.08 (0.003)
	Runout		–	0.03 (0.001)
Shift fork, fork shaft	I.D.		14.000 – 14.021 (0.5512 – 0.5520)	14.04 (0.553)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.		13.957 – 13.968 (0.5495 – 0.5499)	13.90 (0.547)
Transmission	Gear I.D.	M4,M5	31.000 – 31.025 (1.2205 – 1.2215)	31.05 (1.222)
		C1	26.007 – 26.028 (1.0239 – 1.0247)	26.04 (1.025)
		C2, C3	33.000 – 33.025 (1.2992 – 1.3002)	33.05 (1.301)
	Gear busing O.D.	M4, M5	30.975 – 30.985 (1.2195 – 1.2199)	30.93 (1.218)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
		C3	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Gear-to-bushing clearance	M4, M5	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M4	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Mainshaft O.D.	at M4	27.980 – 27.993 (1.1016 – 1.1021)	27.97 (1.101)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)	29.94 (1.179)
	Bushing-to-shaft clearance	M4	0.007 – 0.041 (0.0028 – 0.0016)	0.08 (0.003)
		C2	0.010 – 0.056 (0.0004 – 0.0022)	0.10 (0.004)

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		-	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	-
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	-
Axle runout		-	0.2 (0.01)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel balance weight		-	60 g (2.1 oz) max.
Fork	Spring free length	348.7 (13.73)	341.7 (13.45)
	Tube runout	-	0.20 (0.008)
	Recommended fork fluid	Honda Ultra Cushion Oil 10W or equivalent	-
	Fluid level	160 (6.3)	-
	Fluid capacity	500 ± 2.5 cm ³ (16.9 ± 0.08 US oz, 17.6 ± 0.09 Imp oz)	-
	Pre-load adjuster initial setting	14 mm (0.6 in) from top/4th groove	-
	Rebound adjuster initial setting	1 - 1/2 turn out from full hard	-
Steering head bearing pre-load		1.0 - 1.5 kgf (2.2 - 3.3 lbf)	-

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			-	2.0 (0.08)
Cold tire pressure	Driver only		290 kPa (2.90 kgf/cm ² , 42 psi)	-
	Driver and passenger		290 kPa (2.90 kgf/cm ² , 42 psi)	-
Axle runout			-	0.2 (0.01)
Wheel rim runout	Radial		-	2.0 (0.08)
	Axial		-	2.0 (0.08)
Wheel balance weight			-	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID50ZVM2-114LE	-
		RK	RK50LF0Z2-114LE	-
	Slack		25 - 35 (1.0 - 1.4)	-
Shock absorber	Spring preload adjuster standard position		2nd position	-
	Rebound adjuster initial setting		10 clicks out from full hard	-

GENERAL INFORMATION

HYDRAULIC BRAKE SPECIFICATIONS

		Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	Honda DOT 4 brake fluid	–
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout	–	0.20 (0.008)
	Master cylinder I.D.	14.0 (0.55)	–
	Caliper cylinder I.D.	30.2 (1.19)	–
Rear	Specified brake fluid	Honda DOT 4 brake fluid	–
	Brake disk thickness	6.0 (0.24)	5.0 (0.20)
	Brake disc runout.	–	0.30 (0.012)
	Master cylinder I.D.	14.0 (0.55)	–
	Caliper cylinder I.D.	38.1 (1.50)	–

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 11 Ah
	Current leakage		2.0 mA max.
	Voltage (20° C/68° F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.5 A/0.5 h
Alternator	Capacity		0.421 kW/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20° C/68° F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (option)	NGK	DPR8EA-9 (DPR9EA-9)
	DENSO	X24EPR-U9 (X27EPR-U9)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		5° BTDC at idle

ELECTRIC STARTER SPECIFICATIONS

		Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Starter motor brush length		12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 60 W
		Lo	12V – 55 W
	Position light (except U type)		12V – 5 W
	Brake/tail light		LED (5.7 W/0.8 W)
	Turn signal light		12V – 21 W X 4
	License light		12V – 5 W
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Temperature indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Immobilizer indicator		LED
Fuse	Main fuse		30 A
	Sub fuse		20 A X 2, 10 A X 4
Tachometer peak voltage			10.5 V minimum
Engine coolant temperature resistance		80°C (68°F)	47.5 – 56.8 kΩ
		120°C (248°F)	14.9 – 17.3 kΩ

GENERAL INFORMATION

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE FASTENER TYPE	N·m (kgf·m, lbf·ft)	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt	10 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)	(8 mm head, small flange)	
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt	12 (1.2, 9)
		(8 mm head, large flange)	
		6 mm flange bolt	12 (1.2, 9)
		(10 mm head) and nut	
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

- Torque specifications listed below are for important fasteners.
- Others should be tightened to standard torque values listed above.

NOTE

1. Apply sealant to the threads.
2. Apply a locking agent to the threads.
3. Stake.
4. Apply oil to the threads and flange surface.
5. U-nut.
6. ALOC bolt/screw: replace with a new one.
7. Apply grease to the threads.
8. Apply molybdenum disulfide oil to the threads and seating surface
9. CT bolt
10. Apply oil to a new O-ring.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	12	15 (1.5, 11)	
Timing hole cap	1	14	10 (1.0, 7)	NOTE 7
Crankshaft hole cap	1	30	10 (1.0, 7)	NOTE 7
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 10
Engine oil drain plug	1	14	29 (3.0, 22)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump assembly bolt	3	6	13 (1.3, 9)	NOTE 9
Oil pump driven sprocket bolt/washer	1	6	15 (1.5, 11)	NOTE 2
Oil pass pipe plate mounting bolt	4	6	12 (1.2, 9)	NOTE 2
Oil cooler bolt (filter boss)	1	20	74 (7.5, 54)	

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ECT (Engine Coolant Temperature)/thermo sensor	1	12	23 (2.3, 17)	
Throttle body insulator band screw	8	5	See page 1-15	
Service check bolt	1	6	12 (1.2, 9)	
Fuel rail mounting bolt	3	6	10 (1.0, 7)	
Starter valve lock nut	4	10	2 (0.18, 1.3)	
Choke cable/throttle stop screw bracket mounting screw	2	6	5 (0.5, 3.6)	
Starter valve synchronization plate screw	4	3	1 (0.09, 0.7)	
Choke link plate screw	1	3	1 (0.09, 0.7)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Coolant drain bolt	1	6	13 (1.3, 9)	NOTE 9
Water pump cover flange bolt	2	6	13 (1.3, 9)	NOTE 9
Lower radiator hose joint mounting bolt	1	6	13 (1.3, 9)	NOTE 9

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Left crankcase side cover mounting special bolt	3	6	6 (0.6, 4.3)	NOTE 2
Left crankcase rear cover damper rubber plate special bolt	1	6	12 (1.2, 9)	
Drive sprocket bolt	1	10	54 (5.5, 40)	

CYLINDER HEAD/CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head mounting flange nut	12	10	45 (4.6, 33)	NOTE 4
Cylinder head mounting flange bolt	4	8	25 (2.5, 18)	NOTE 4
Cylinder head sealing bolt	2	18	32 (3.3, 24)	NOTE 2
Camshaft holder flange bolt	20	6	12 (1.2, 9)	NOTE 9
Cylinder head cover bolt	8	6	10 (1.0, 7)	
PAIR reed valve cover SH bolt	4	6	13 (1.3, 9)	
Intake cam sprocket/cam pulse generator rotor	2	7	20 (2.0, 14)	NOTE 2
UBS bolt	2	7	20 (2.0, 14)	NOTE 2
Exhaust cam sprocket flange dowel bolt				
Cylinder head stud bolt (exhaust pipe stud bolt)	8	6	See page 1-16	

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch cover damper rubber set plate bolt	1	6	12 (1.2, 9)	NOTE 2
Clutch center lock nut	1	25	137 (14.0, 101)	NOTE 3, 4
Clutch spring bolt/washer	6	6	12 (1.2, 9)	NOTE 2
Clutch slave cylinder bleeder screw	1	8	9 (0.9, 6.5)	
Shift drum center bolt	1	8	23 (2.3, 17)	
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Alternator wire clamp socket bolt	1	6	9 (0.9, 6.5)	NOTE 2
Starter one-way clutch outer socket bolt	6	8	16 (1.6, 12)	
Flywheel flange bolt	1	10	113 (11.5, 83)	
Alternator stator mounting socket bolt	4	6	12 (1.2, 9)	

CRANKCASE/TRANSMISSION/BALANCER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankshaft main journal flange bolt	12	9	33 (3.4, 25)	NOTE 4
Crankcase bolt	1	10	39 (4.0, 29)	
Crankcase bolt	18	8	25 (2.5, 18)	
Crankcase bolt	4	6	12 (1.2, 9)	NOTE 2, 3
Oil pass pipe plate bolt	3	6	12 (1.2, 9)	
Lower crankcase sealing bolt	2	20	29 (3.0, 22)	
Lower crankcase sealing bolt	2	10	12 (1.2, 9)	NOTE 2
Connecting rod bearing cap nut	8	8	41 (4.2, 30)	NOTE 4
Balancer shaft special bolt	1	6	12 (1.2, 9)	NOTE 2
Shift fork shaft stopper plate bolt	1	6	12 (1.2, 9)	

GENERAL INFORMATION

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Ignition pulse generator rotor flange bolt	1	10	49 (5.0, 36)	NOTE 4

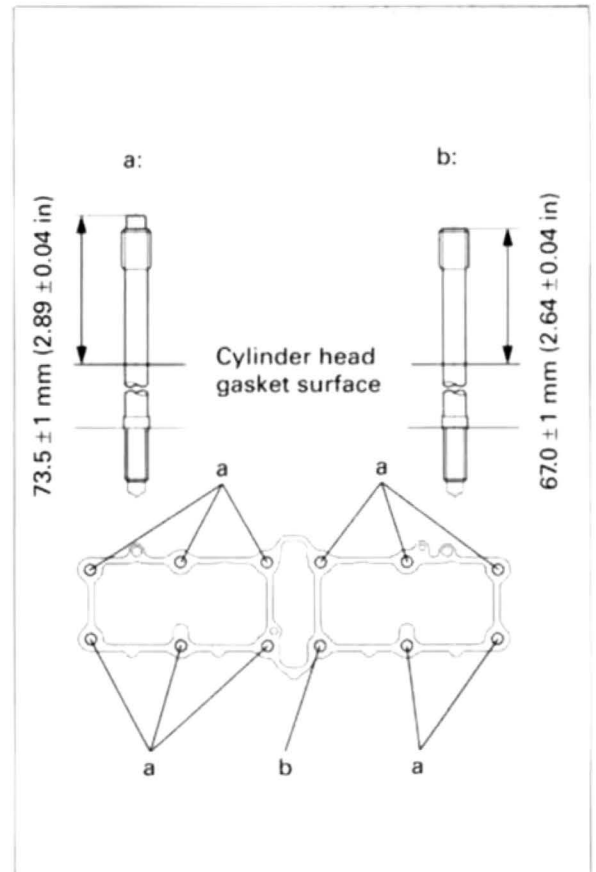
ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor terminal nut	1	6	12 (1.2, 9)	

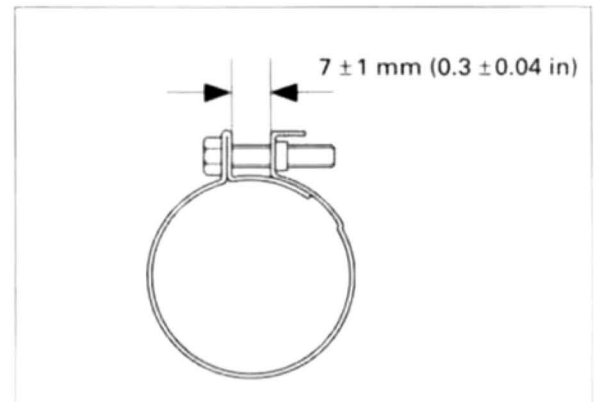
LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Oil pressure switch wire terminal bolt/washer	1	4	2 (0.22, 1.6)	
Neutral switch	1	10	12 (1.2, 9)	

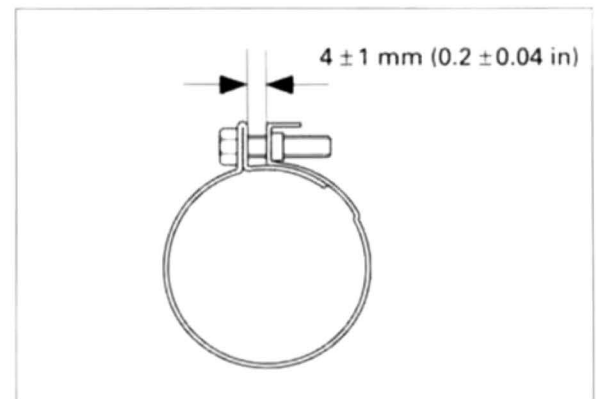
Cylinder stud bolt:



Insulator clamp (Throttle body side):

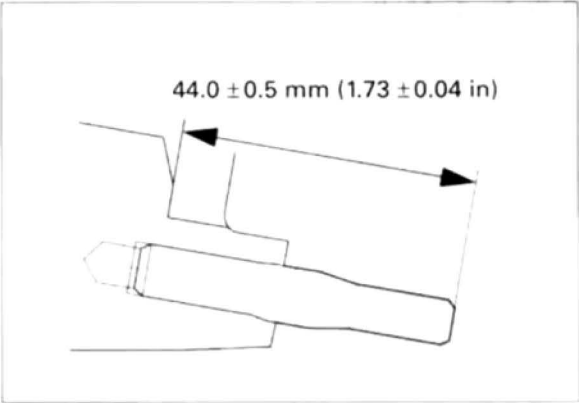


Insulator clamp (Cylinder head side):



GENERAL INFORMATION

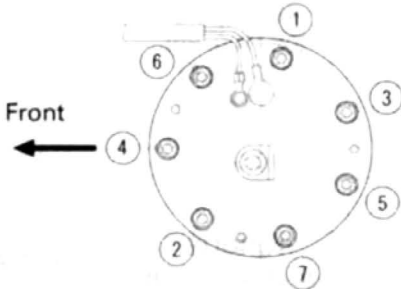
Exhaust pipe stud bolt:



FRAME**FRAME BODY PANELS/EXHAUST SYSTEM**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Grab rail mounting bolt	2	6	12 (1.2, 9)	
Grab rail mounting bolt	2	8	26 (2.7, 20)	
Rear fender A stay mounting bolt	2	8	32 (3.3, 24)	
Exhaust pipe joint cap nut	8	7	12 (1.2, 9)	
Muffler band flange bolt	1	8	22 (2.2, 16)	
Exhaust pipe mounting bolt/nut	1	8	22 (2.2, 16)	
Muffler mounting bolt/nut	1	8	22 (2.2, 16)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel hose banjo bolt (fuel pump side)	1	12	22 (2.2, 16)	Yellow marking
Fuel hose mounting bolt (throttle body side)	2	6	10 (1.0, 7)	
Fuel tank rear bracket socket bolt	2	8	22 (2.2, 16)	
Fuel pump mounting nut	6	6	12 (1.2, 9)	
				
Air cleaner housing cover mounting screw	3	5	1 (0.1, 0.7)	
Front air cleaner housing cover screw	10	5	1 (0.1, 0.7)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cooling fan mounting nut	1	5	3 (0.27, 2.0)	NOTE 2
Fan motor mounting nut	3	5	5 (0.5, 3.6)	
Fan motor bracket mounting nut	3	6	9 (0.9, 6.5)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front engine hanger bolt (engine side)	2	10	59 (6.0, 43)	
Front engine hanger bolt (frame side)	2	10	59 (6.0, 43)	
Rear upper engine hanger plate bolt	2	10	59 (6.0, 43)	
Rear upper engine hanger bolt	1	10	59 (6.0, 43)	
Rear lower engine hanger bolt	1	10	59 (6.0, 43)	
Gearshift pedal pivot bolt	1	8	22 (2.2, 16)	
Gearshift pedal link pinch bolt	1	6	12 (1.2, 9)	

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lever pivot bolt	1	6	1 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.3)	
Clutch master cylinder reservoir cap screw	2	4	2 (0.15, 1.1)	
Clutch switch screw	1	4	1 (0.1, 0.7)	
Clutch hose oil bolt	2	10	34 (3.5, 25)	
Clutch master cylinder mounting bolt	2	6	12 (1.2, 9)	

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar weight mounting screw	2	6	10 (1.0, 7)	NOTE 6
Handlebar upper holder socket bolt	4	8	22 (2.2, 16)	
Handlebar lower holder nut	2	8	26 (2.7, 20)	
Front axle bolt	1	14	59 (6.0, 43)	
Front axle holder flange bolt	4	8	22 (2.2, 16)	NOTE 2
Front brake disc bolt	12	6	20 (2.0, 14)	
Fork bolt	2	39	23 (2.3, 17)	
Fork socket bolt	2	8	20 (2.0, 14)	
Fork top bridge pinch bolt	2	8	23 (2.3, 17)	NOTE 2
Fork bottom bridge pinch bolt	4	8	26 (2.7, 20)	
Steering bearing adjusting nut	1	26	29 (3.0, 22)	See page 13-33
Steering bearing adjusting nut lock nut	1	26	—	
Steering stem nut	1	24	103 (10.5, 76)	

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	22	113 (11.5, 83)	NOTE 5
Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 6
Final driven sprocket nut	6	12	108 (11.0, 80)	NOTE 5
Rear shock absorber upper mounting bolt	2	6	9 (0.9, 6.5)	NOTE 5
Rear shock absorber lower mounting bolt	2	10	37 (3.8, 27)	
Swingarm pivot nut	1	18	108 (11.0, 80)	NOTE 4, 5
Drive chain slider mounting bolt	2	6	9 (0.9, 6.5)	NOTE 6

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front brake caliper mounting bolt	4	8	30 (3.1, 22)	NOTE 6
Front brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Front brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front master cylinder reservoir cap screw	2	4	2 (0.15, 1.1)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	NOTE 2
Brake hose oil bolt	4	10	34 (3.5, 25)	
Front brake caliper pad pin	4	10	18 (1.8, 13)	
Rear brake caliper pad pin	1	10	18 (1.8, 13)	
Brake caliper bleeder valve	3	8	6 (0.6, 4.3)	
Rear master cylinder push rod joint nut	1	8	18 (1.8, 13)	
Front master cylinder mounting bolt	2	6	12 (1.2, 9)	
Front brake caliper assembly torx bolt	8	8	23 (2.3, 17)	
Rear brake hose clamp bolt (swingarm)	1	6	12 (1.2, 9)	
Rear brake hose clamp bolt (caliper bracket)	1	6	9 (0.9, 6.5)	
Rear brake caliper bolt	1	8	23 (2.3, 17)	
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	

LIGHTS/METERS/SWITCHES

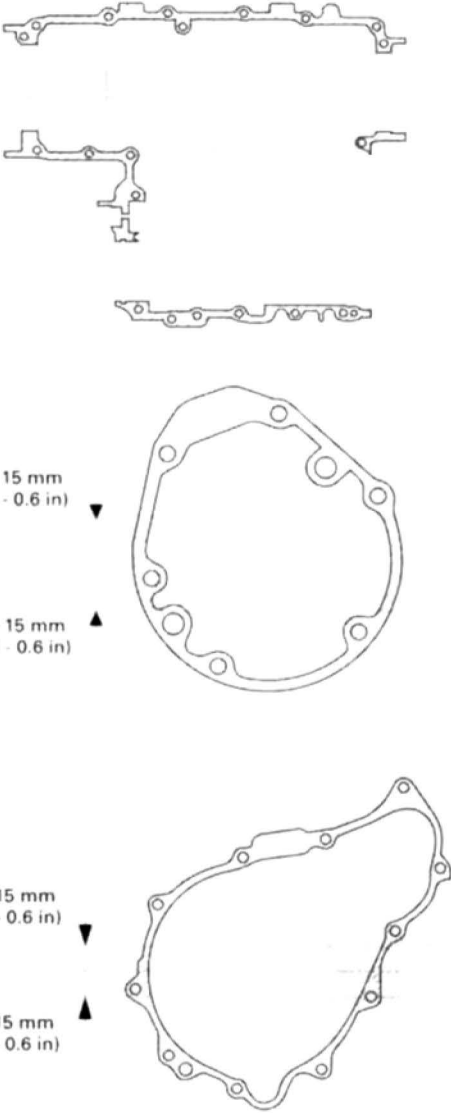
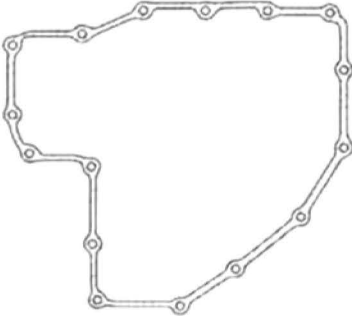
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side stand switch bolt	1	6	10 (1.0, 7)	NOTE 6
Ignition switch mounting bolt	2	8	26 (2.7, 20)	

OTHERS

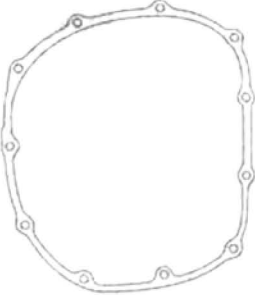
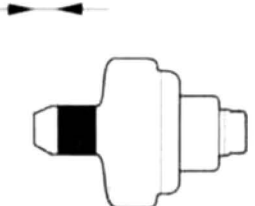
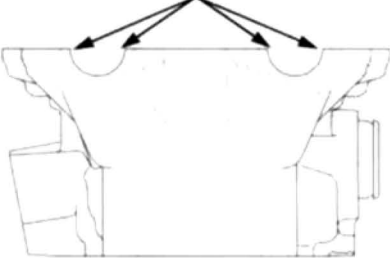
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot nut	1	10	39 (4.0, 29)	
Driver footpeg bracket socket bolt	4	8	32 (3.3, 24)	
Passenger footpeg bracket socket bolt	4	8	26 (2.7, 20)	

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
<p>Crankcase mating surface</p>  <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>Oil pan mating surface</p> 	<p>Liquid sealant (Three Bond 1207B or equivalent)</p>	

GENERAL INFORMATION

LOCATION	MATERIAL	REMARKS
<p>Right crankcase cover mating surface</p>  <p>Oil pressure switch threads</p> <p>Do not apply to the thread head 3 - 4 mm (0.1 - 0.2 in.)</p> 	<p>Liquid sealant (Three Bond 1207B or equivalent)</p>	
<p>Cylinder head semi-circular cut-out</p> <p>APPLIED PORTION (8 PLACES)</p>  <p>Stator wire grommet</p> <p>Ignition pulse generator wire grommet</p>	<p>Sealant</p>	
<p>Main journal bearing surface</p> <p>Connecting rod bearing surface</p> <p>Connecting rod small end inner surface</p> <p>Crankshaft thrust surface</p> <p>Camshaft lobes/journals and thrust surface</p> <p>Valve stem (valve guide sliding surface)</p> <p>Valve lifter outer sliding surface</p> <p>Piston pin sliding surface</p> <p>Clutch outer/primary driven gear sliding surface</p> <p>Clutch outer/needle bearing sliding surface</p> <p>Clutch outer guide sliding surface</p> <p>M3, C4, C5 shifter gear (shift fork grooves)</p> <p>Starter reduction gear shaft outer surface</p>	<p>Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)</p>	

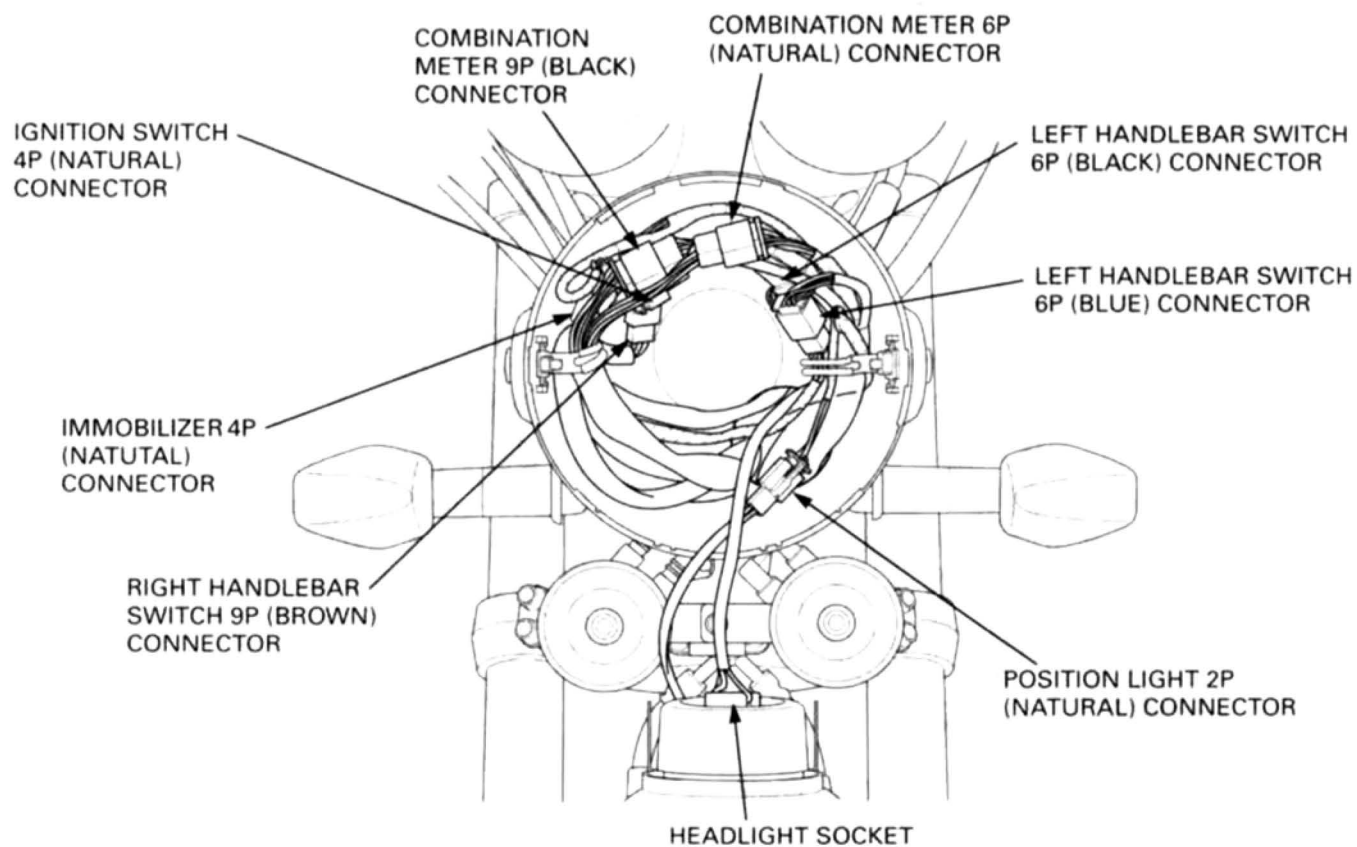
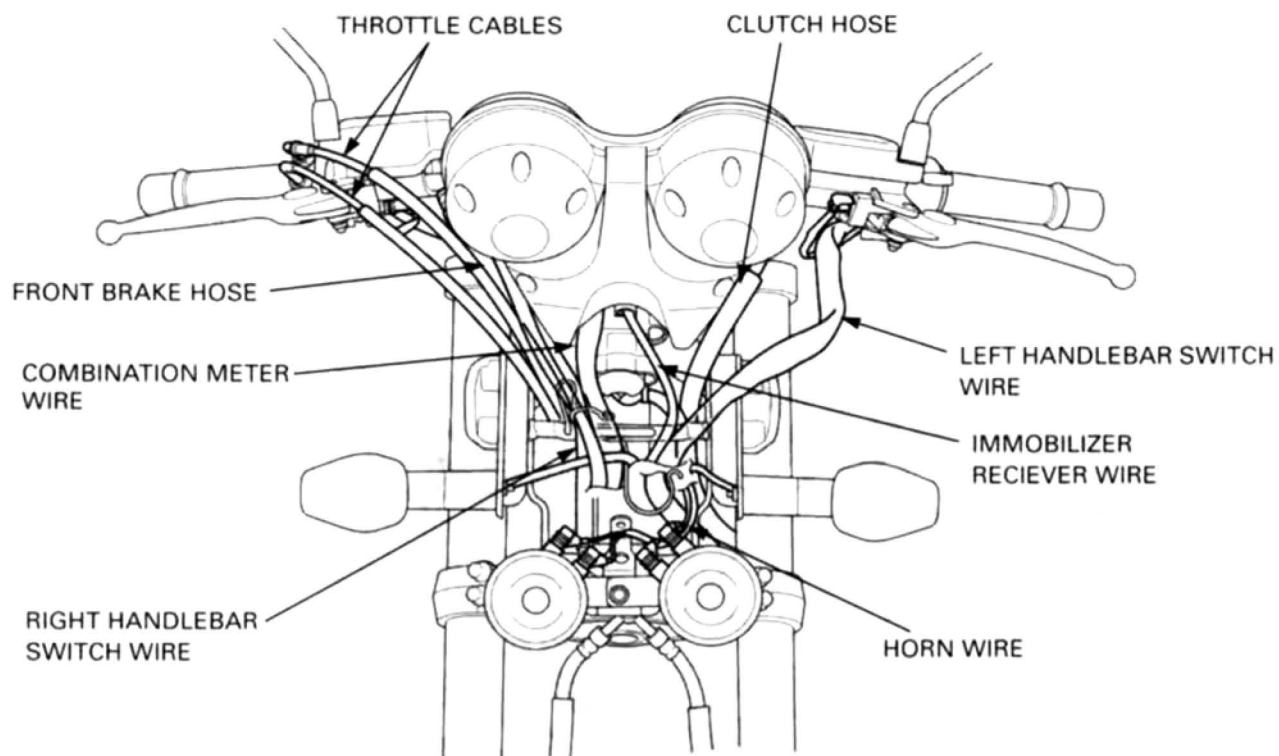
LOCATION	MATERIAL	REMARKS
Piston/piston ring sliding area Each gear teeth and rotating surface Each bearing Each O-ring Clutch joint piece Clutch disc surface Clutch lifter rod Oil strainer packing Oil pass plate seal Starter one-way clutch sliding surface Oil cooler bolt threads Ignition pulse generator bolt threads and seating surface Flywheel bolt threads and seating surface Cylinder head mounting nut threads and seating surface Connecting rod nut threads and seating surface Camshaft holder bolt threads and seating surface Oil filter cartridge O-ring Clutch center lock nut threads and seating surface Each tightening nut threads and seating surface Other rotating area and sliding surface	Engine oil	
Balancer damper rubber fitting area Timing hole cap threads Crankshaft hole cap threads Each oil seal lips	Multi-purpose grease	
Upper crankcase 10 mm sealing bolt threads Lower crankcase 10 mm sealing bolt threads Lower crankcase 20 mm sealing bolt threads Cylinder head 18 mm sealing bolt threads Cylinder head cover breather plate bolt threads Cam pulse generator rotor/intake cam sprocket bolt threads Exhaust cam sprocket bolt threads Oil pump drive chain guide bolt threads Oil pump driven sprocket bolt threads Oil pass pipe plate bolt threads Oil pass pipe/oil pipe bolt threads Shift drum center bolt threads Shift drum bearing set plate bolt threads Shift fork shaft stopper plate bolt threads Clutch cover damper rubber mounting bolt threads Starter one-way clutch outer bolt threads	Locking agent	Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm
Clutch slave cylinder O-ring	Silicone grease	

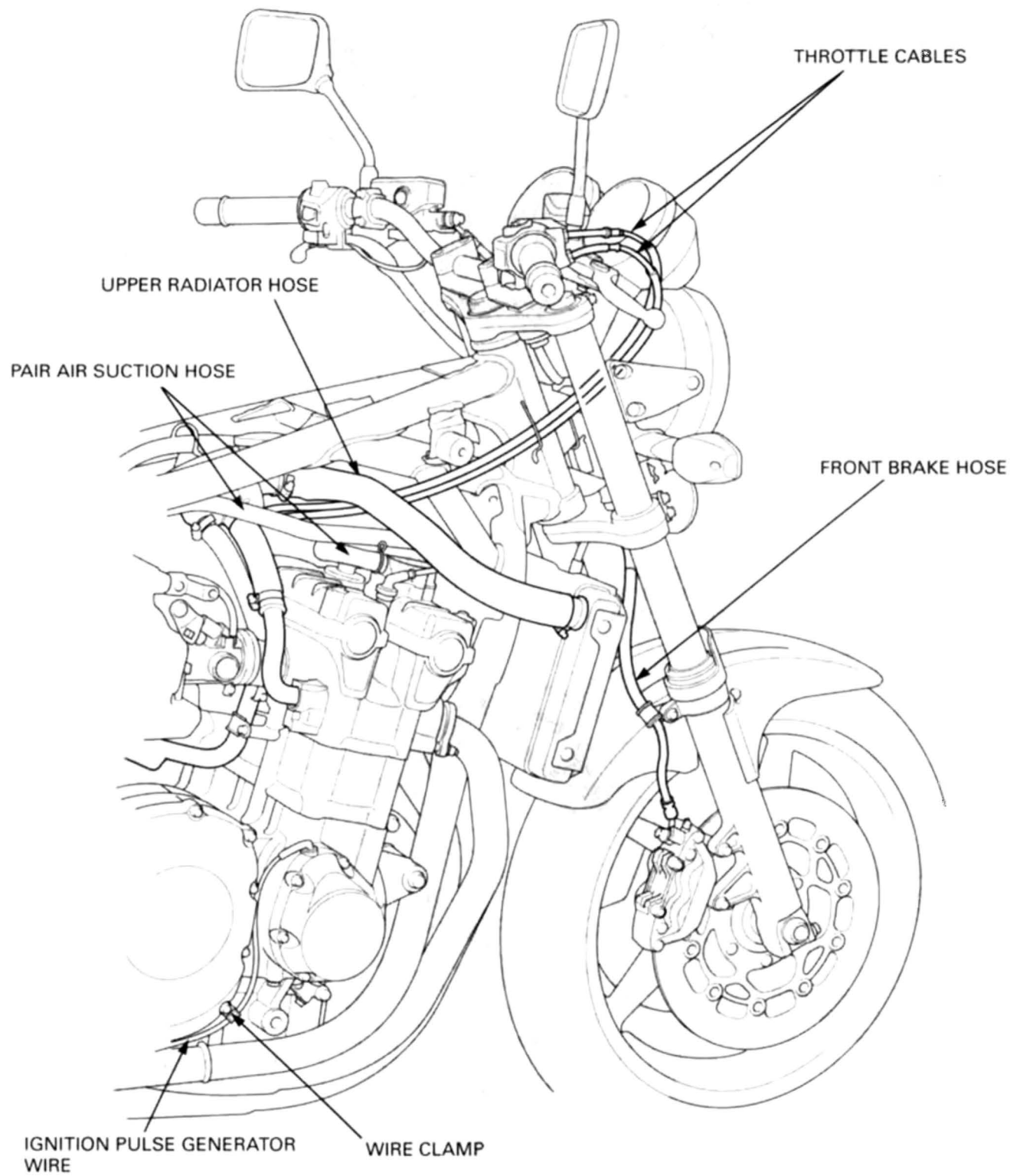
GENERAL INFORMATION

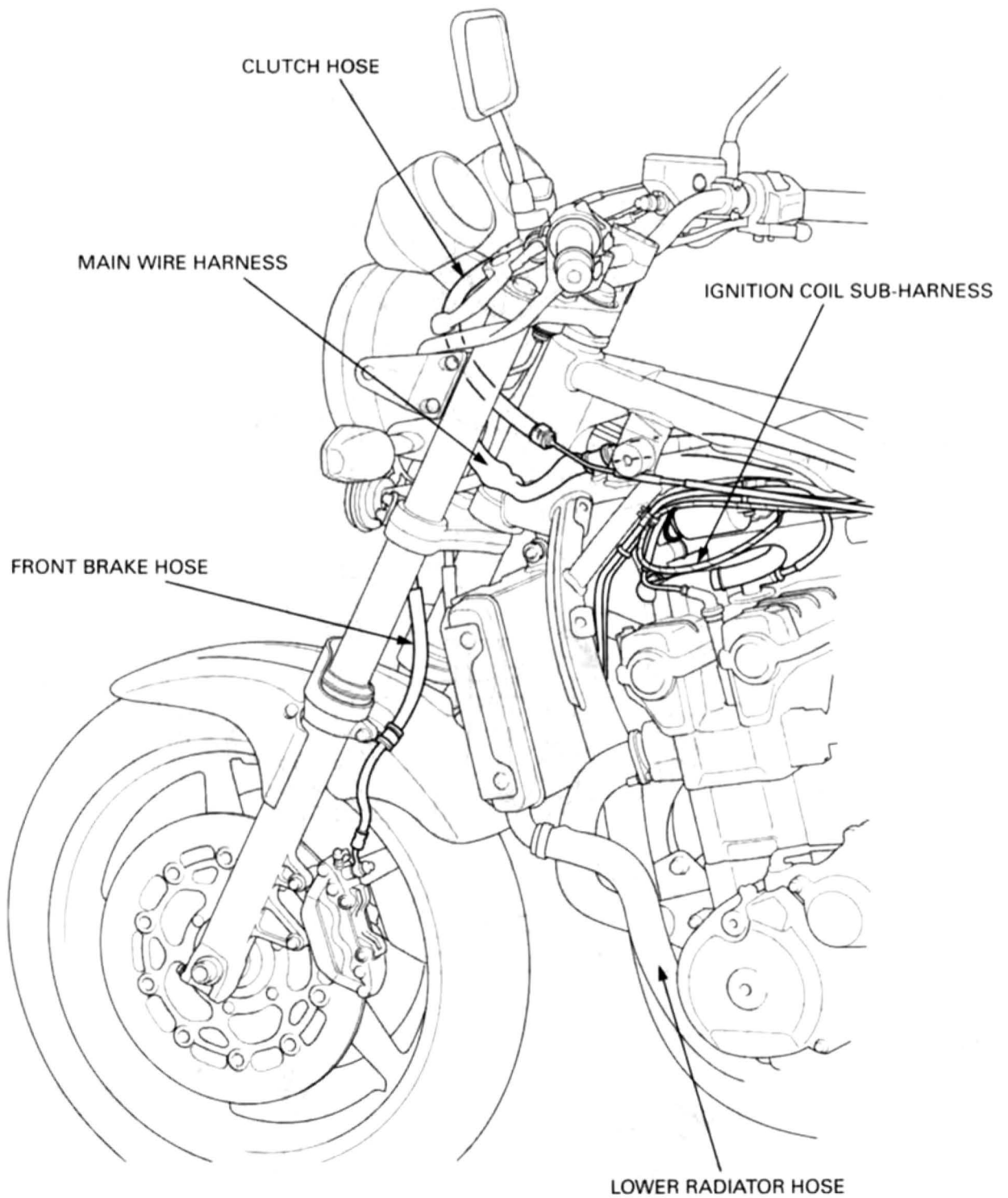
FRAME

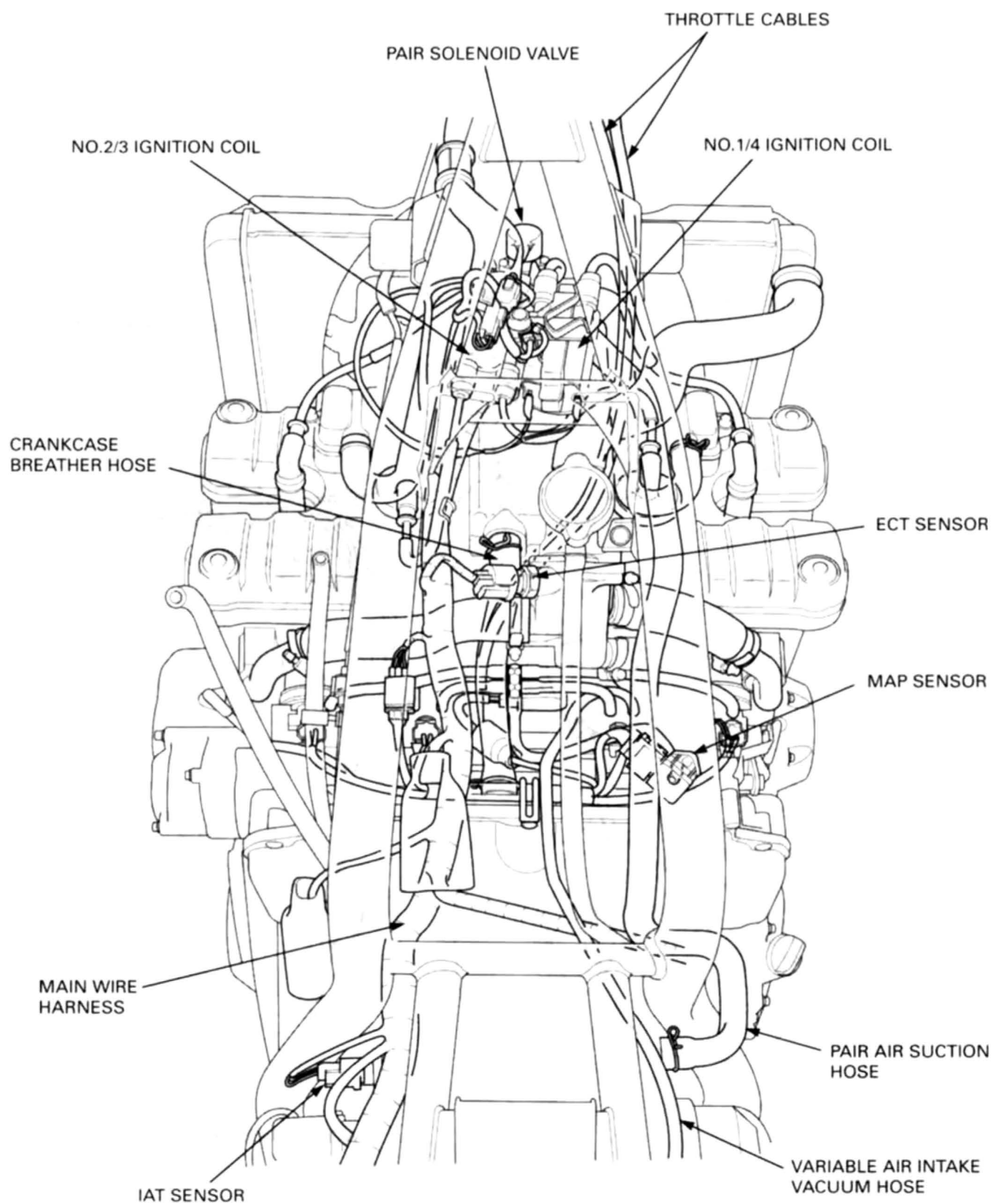
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips Rear wheel dust seal lips Each dust seal lips Throttle grip pipe flange Clutch lever pivot bolt sliding area Rear brake pedal pivot sliding area Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Driver footpeg sliding area Passenger footpeg sliding area Side stand pivot Center stand (optional) pivot	Multi-purpose grease	
Steering head bearing sliding surface Steering head dust seal lips	Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan), Shell Stamina EP2 or equivalent	
Swingarm pivot bearings Swingarm pivot dust seal lips	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Throttle cable A, B outer inside	Cable lubricant	
Rear shock absorber spring adjuster cam surface	G-n paste	
Handlebar grip rubber inside	Honda bond A or equivalent	
Swingarm pivot nut threads and seating surface Steering bearing adjustment nut threads	Engine oil	
Front brake lever-to-master piston contacting area Clutch lever-to-master piston contacting area Rear master brake master piston-to-push rod contact area Brake caliper dust seals Rear brake caliper boot inside Rear brake caliper pin boot inside	Silicone grease	
Brake master piston and cups Brake caliper piston and piston seals	DOT 4 brake fluid	
Fork cap O-ring Fork dust seal and oil seal lips	Fork fluid	
Front brake caliper assembly bolt threads Fork socket bolt threads Rear brake caliper pin bolt threads	Locking agent	

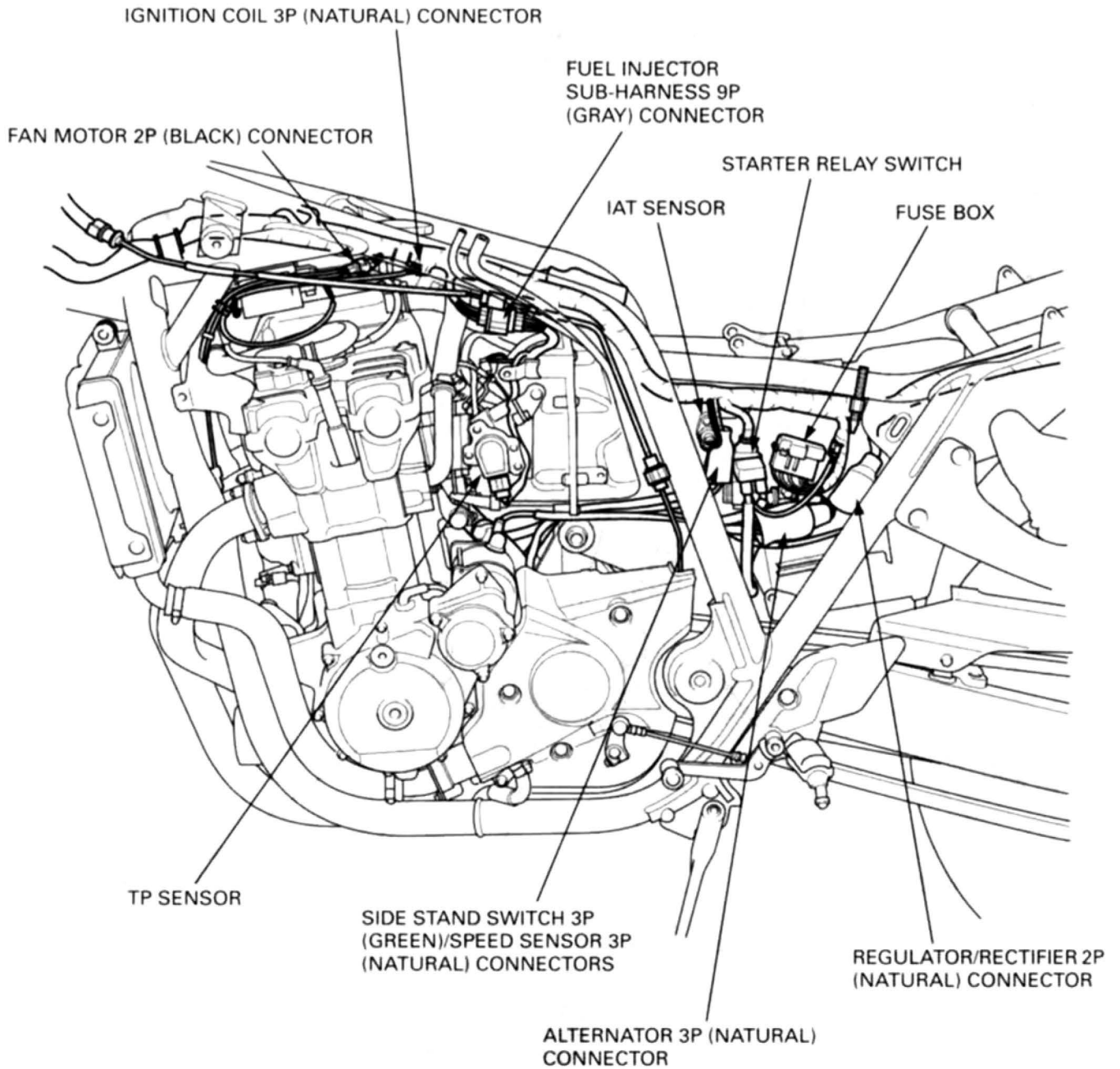
CABLE & HARNESS ROUTING

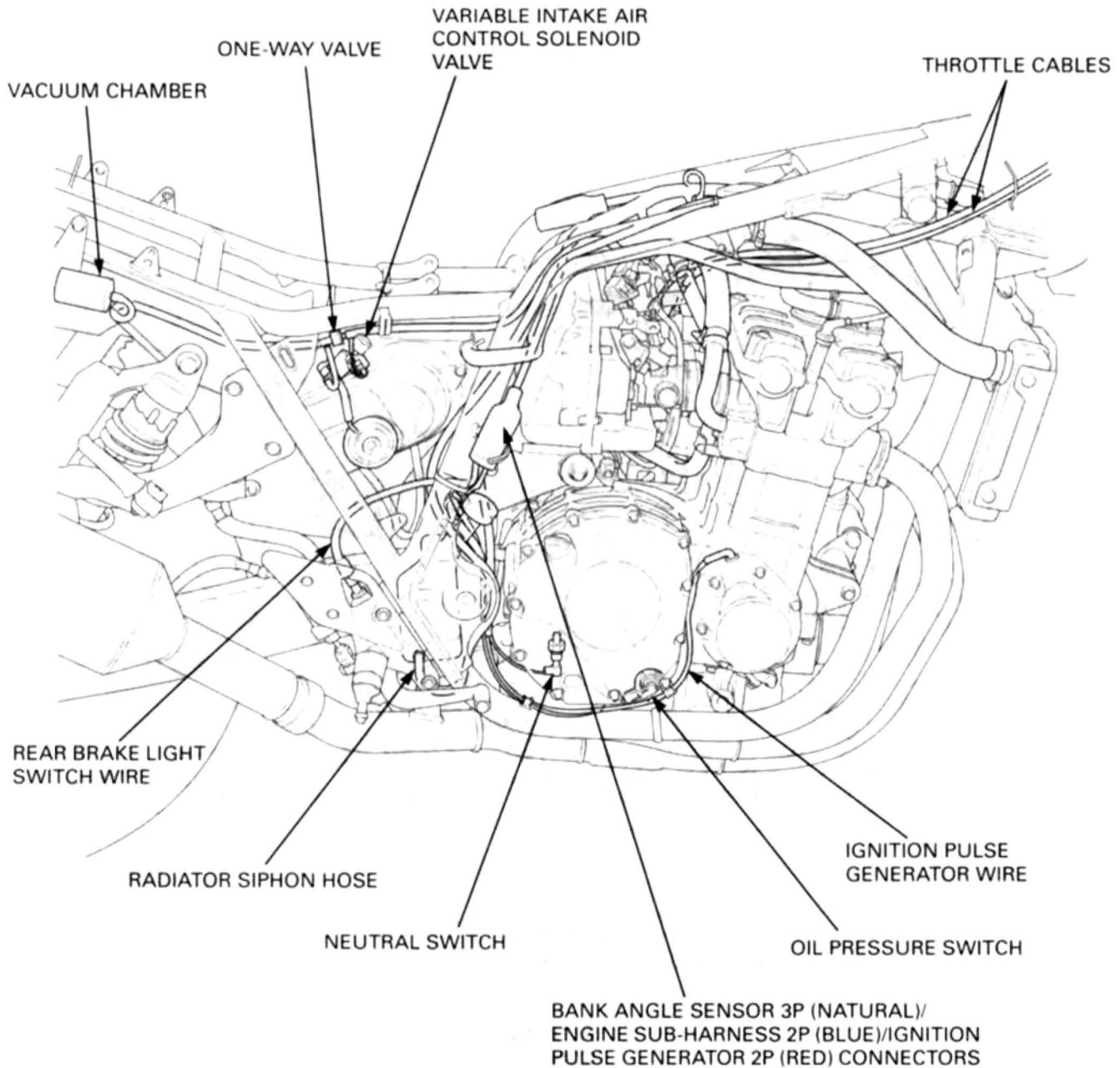


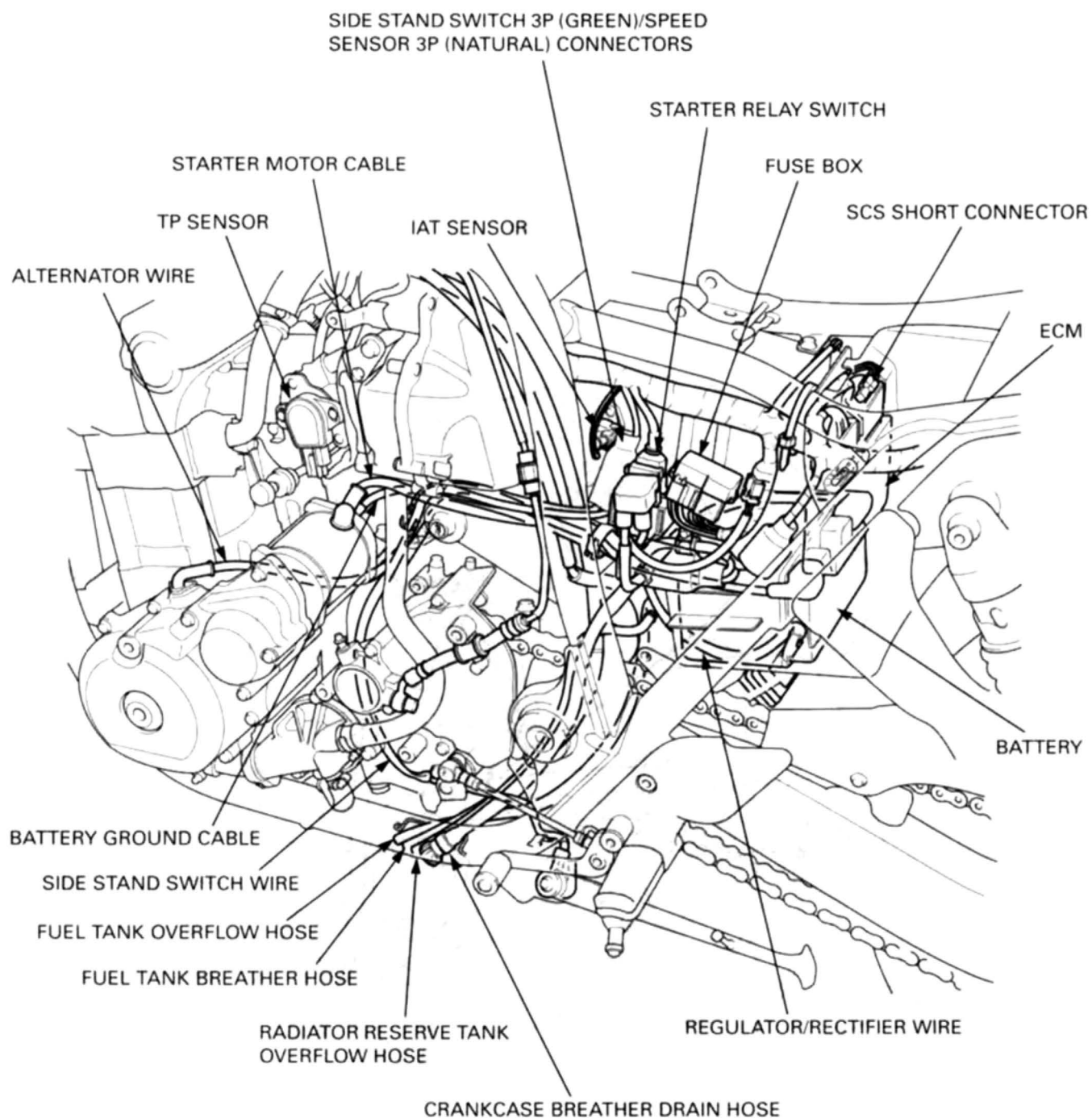


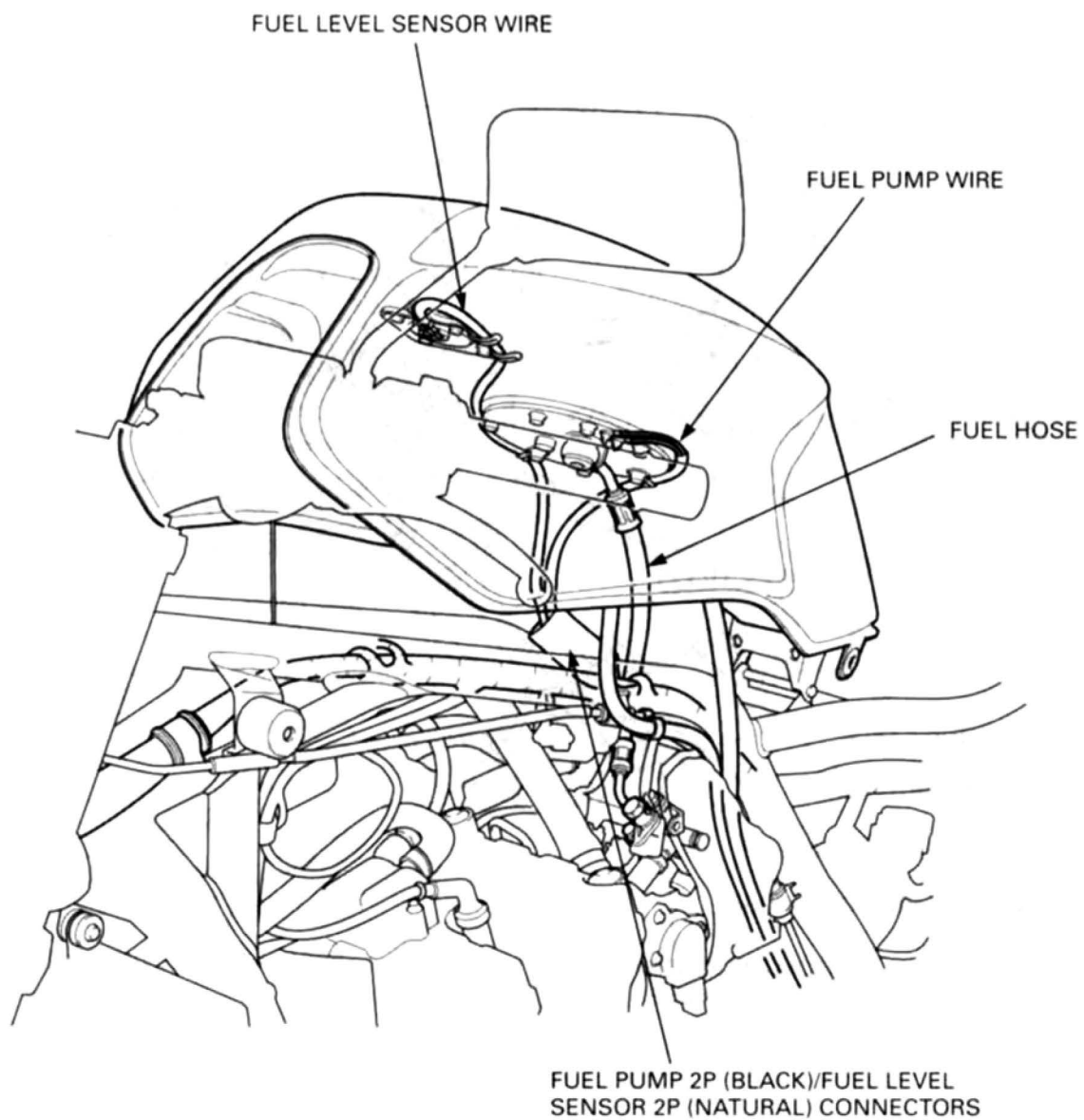


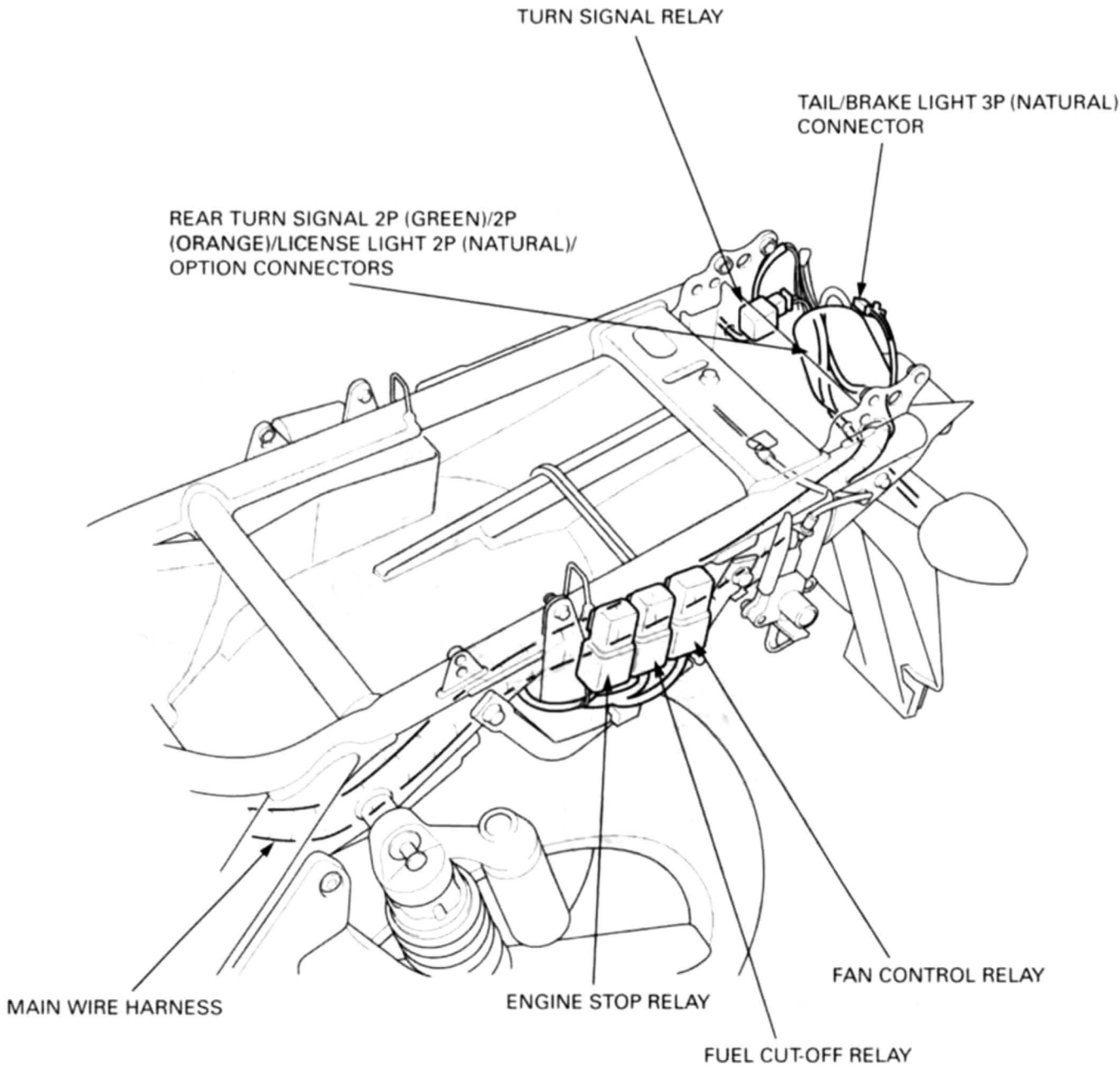












EMISSION CONTROL SYSTEMS

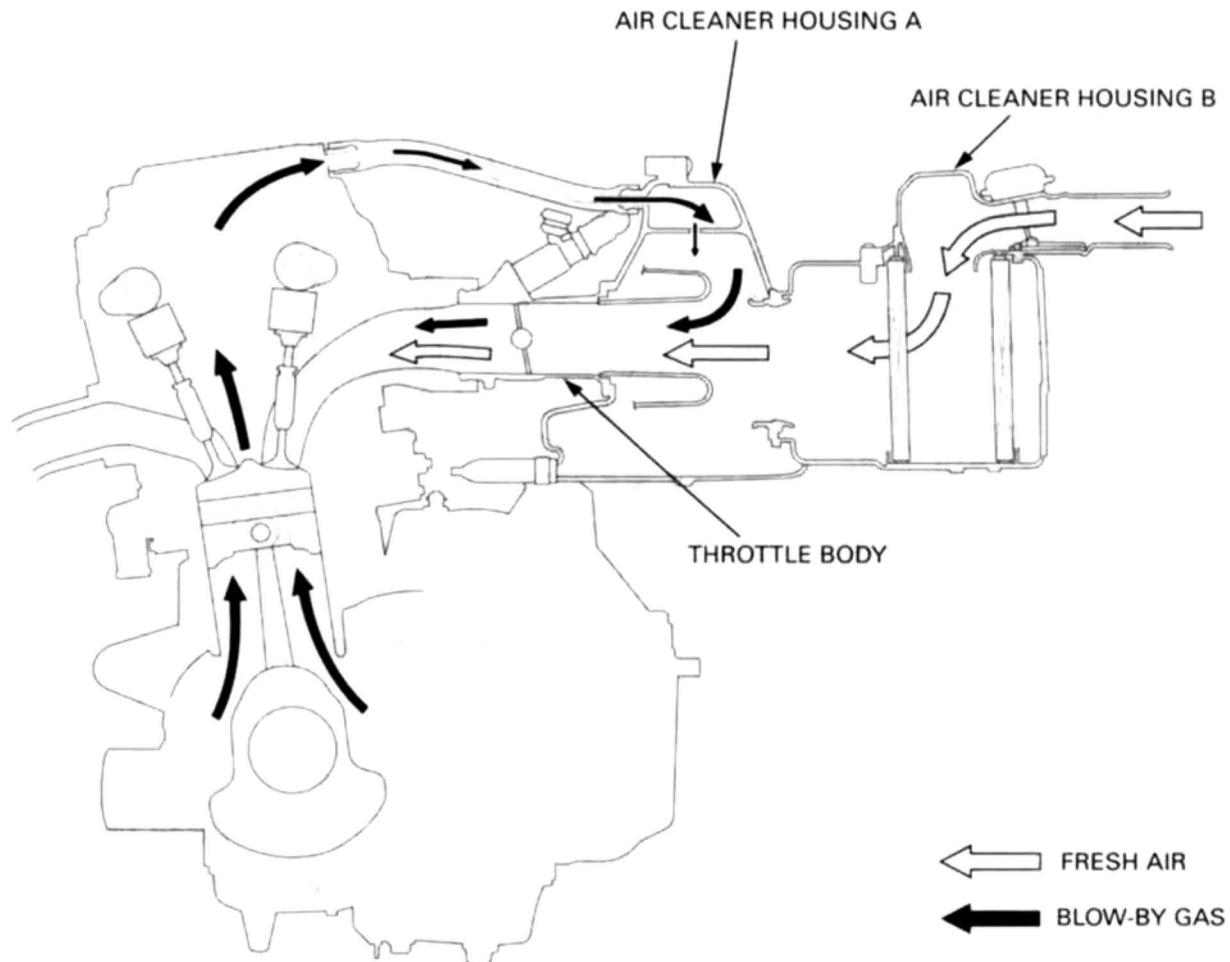
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean injection settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and throttle body.



GENERAL INFORMATION

EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

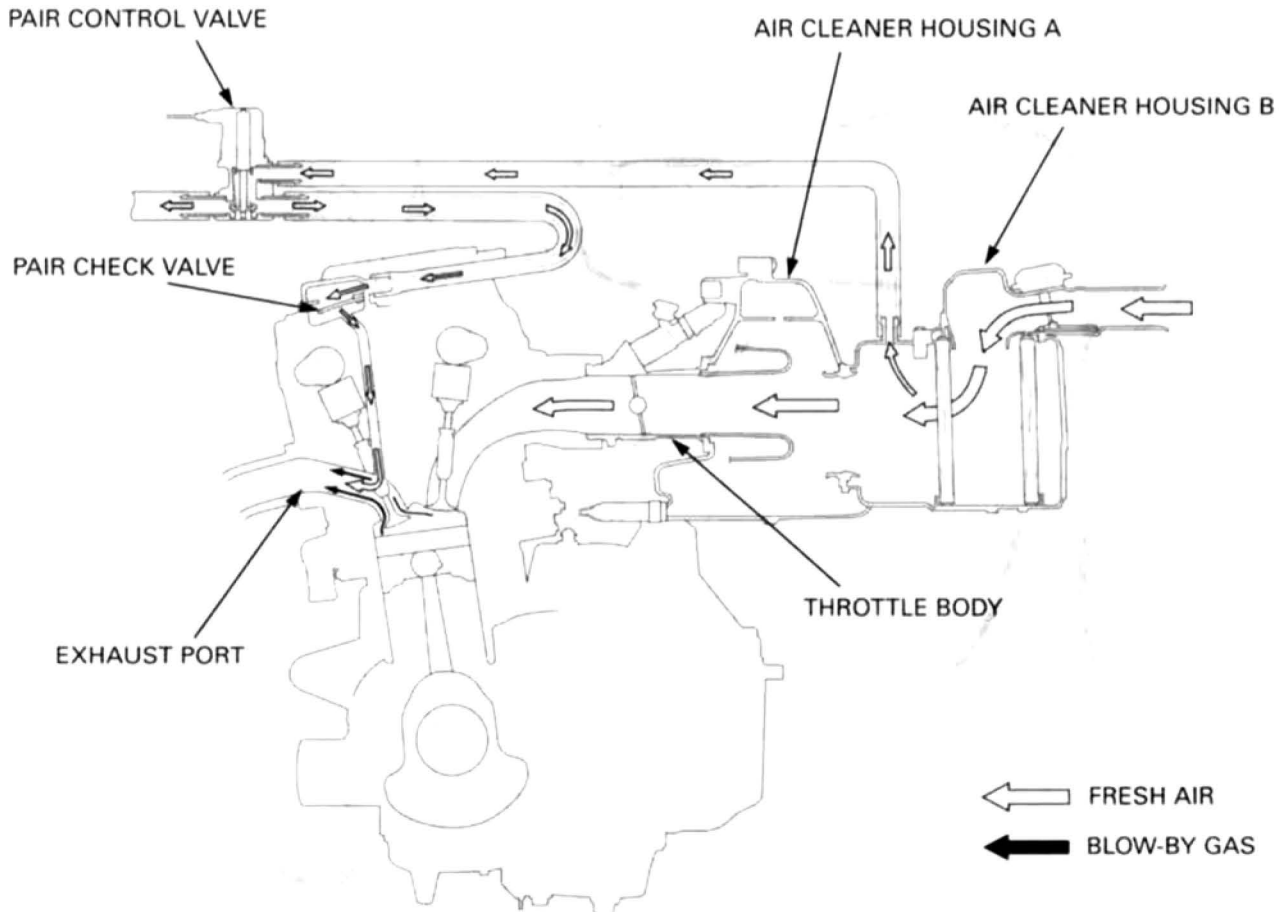
The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crank case emission control system.

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR (Pulse Secondary Air Injection) control valve.

This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevents reverse air flow through the system. The PAIR control valve is operated by the solenoid valve. The solenoid valve is controlled by the PGM-FI unit, and the fresh air passage is opened/closed according the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Local law prohibits the following acts or the causing there of: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

TWO-WAY HANDLEBAR POSITION 2-2

TWO-WAY HANDLEBAR POSITION

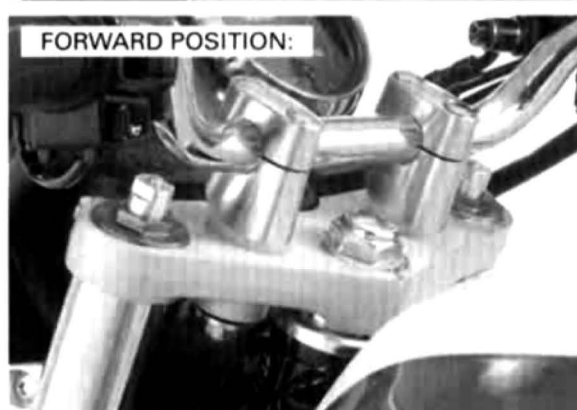
The handlebar position can be adjusted by moving the handlebar lower holder.

To adjust the handlebar position:

1. Loosen the handlebar lower holder nuts but do not remove them.
2. Remove the handlebar upper holder bolt caps, handlebar holder bolts and holders.



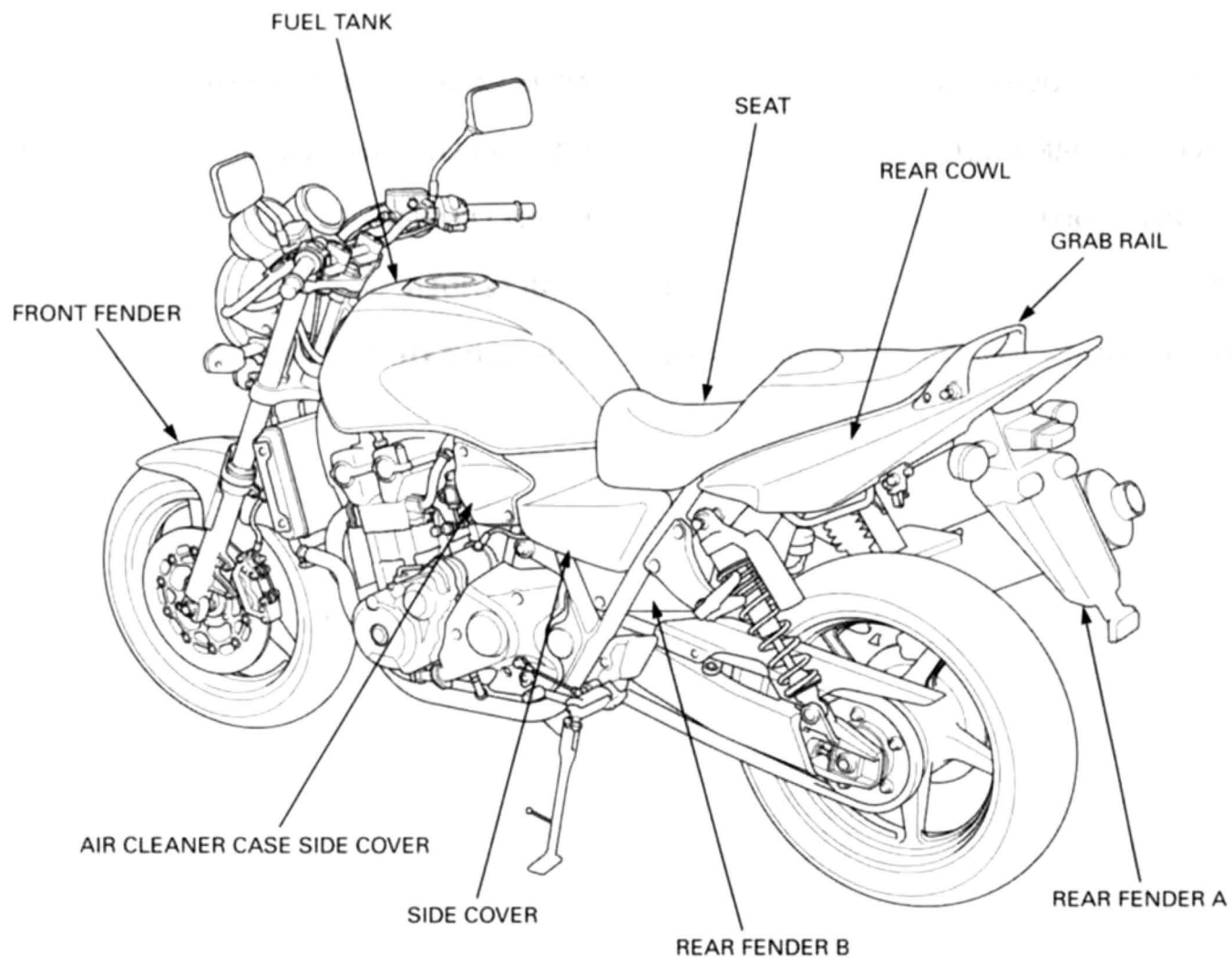
3. Remove the handlebar assembly and turn the lower holders 90 degrees.
4. Reinstall the handlebar upper holders with their punch marks facing forward.
5. Install the upper holder bolts, tighten the forward bolts first, then the rear bolts.
6. Tighten the handlebar lower holder nuts.
7. Install the handlebar upper holder bolt caps.



3. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	3-2	AIR CLEANER CASE SIDE COVER	3-5
SERVICE INFORMATION	3-3	GRAB RAIL/REAR COWL	3-5
TROUBLESHOOTING	3-3	FRONT FENDER	3-7
SEAT	3-4	REAR FENDER	3-8
SIDE COVER	3-4	MUFFLER/EXHAUST PIPE	3-12

BODY PANEL LOCATIONS



SERVICE INFORMATION

GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- This section covers removal and installation of the body panels and exhaust system.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Grab rail mounting 6 mm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Grab rail mounting 8 mm bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Rear fender A stay mounting bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)
Exhaust pipe joint cap nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
Muffler band flange bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Exhaust pipe mounting bolt/nut	22 N·m (2.2 kgf·m, 16 lbf·ft)
Muffler mounting bolt/nut	22 N·m (2.2 kgf·m, 16 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

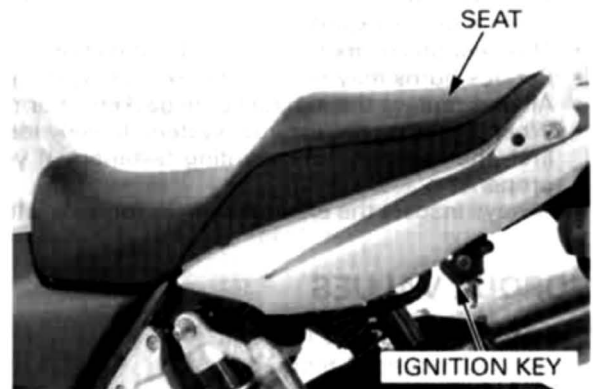
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

SEAT

REMOVAL

Unhook the seat with the ignition key.

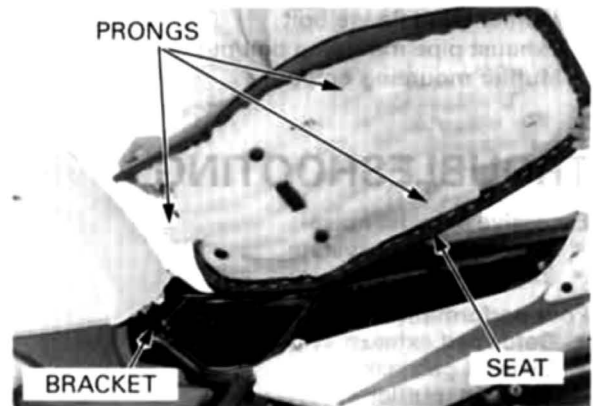
Pull the seat back and remove it.



INSTALLATION

Install the seat, inserting the prong into the retainer on the fuel tank rear bracket and the hooks into the catches on the frame.

Push the seat forward, then down to lock it.



SIDE COVER

REMOVAL/INSTALLATION

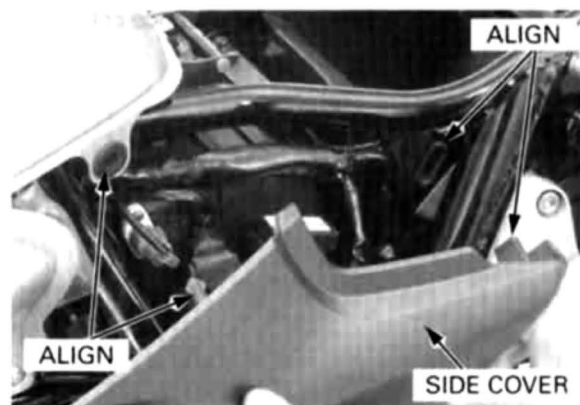
Remove seat (page 3-4).

Remove the side cover mounting bolt.

Release the tabs of the side cover from the fuel tank and frame grommets, then remove the side cover.



Install the side cover while aligning its tabs with the grommet on the fuel tank and frame.
Install and tighten the mounting bolt securely.
Install the seat (page 3-4).



AIR CLEANER CASE SIDE COVER

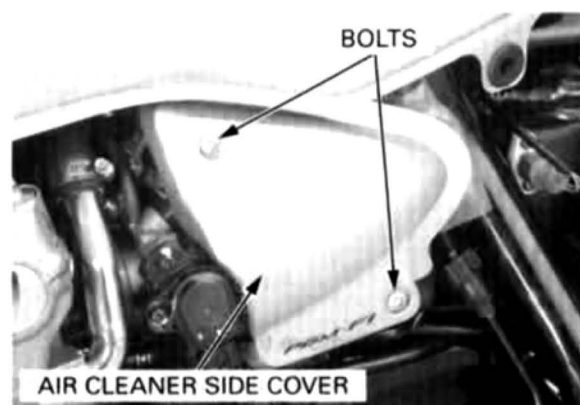
REMOVAL/INSTALLATION

Remove the following:

- Seat (page 3-4)
- Side cover (page 3-4)

Remove the bolts and air cleaner case side cover.

Installation is in the reverse order of removal.



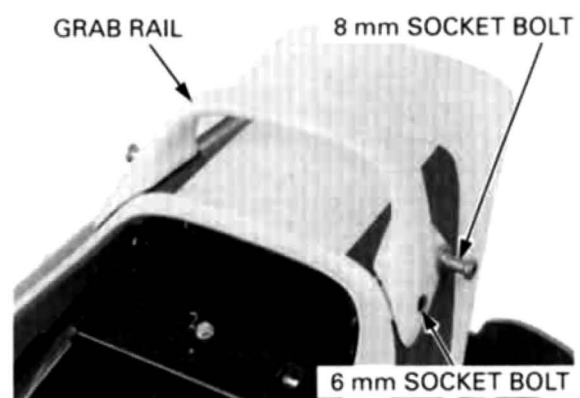
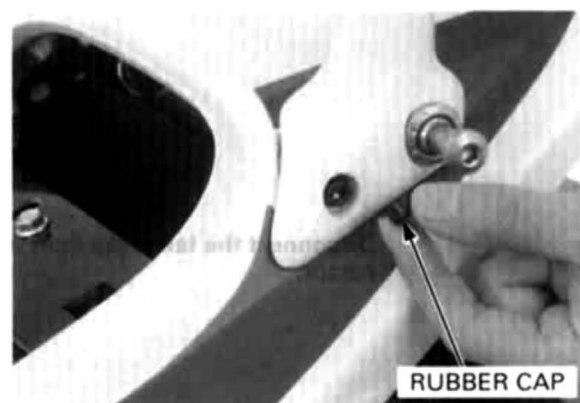
GRAB RAIL/REAR COWL

REMOVAL

Remove the seat (page 3-4).

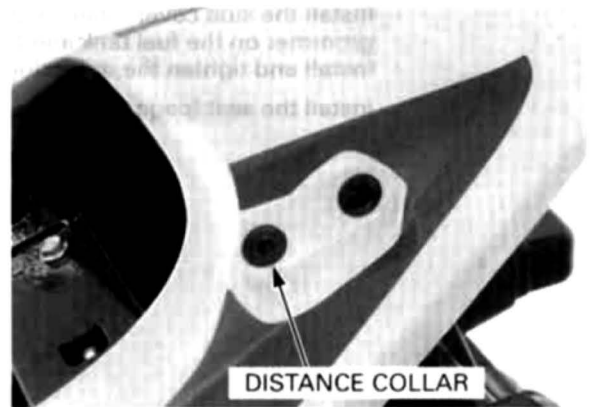
Remove the rubber caps.

Remove the two 8 mm socket bolts, two 6 mm socket bolts and grab rail.



FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the distance collars.

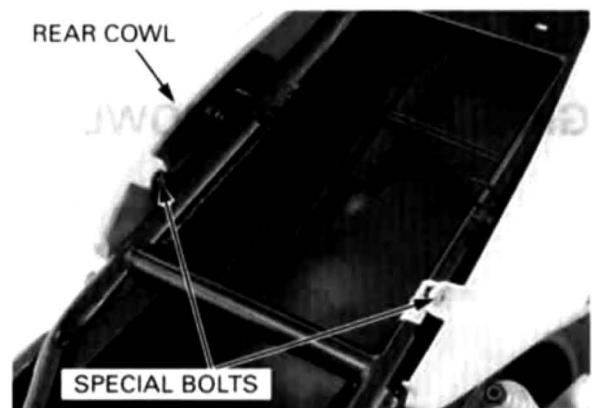


Remove the trim clips.



Remove the special bolts.

Carefully pulling the both side of the rear cowl, then remove it from the seat rail.



Disconnect the tail/brake light unit 3P (Natural) connector.



INSTALLATION

Installation is in the reverse order of removal.

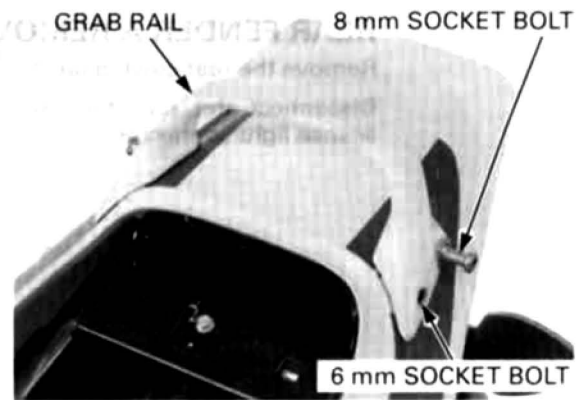
Make sure that the mating surfaces of the cowl bottom are seated onto the rear fender properly before tightening the fasteners.

Tighten the rear cowl screws and grab rail mounting bolts to the specified torque.

TORQUE:

6 mm socket bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

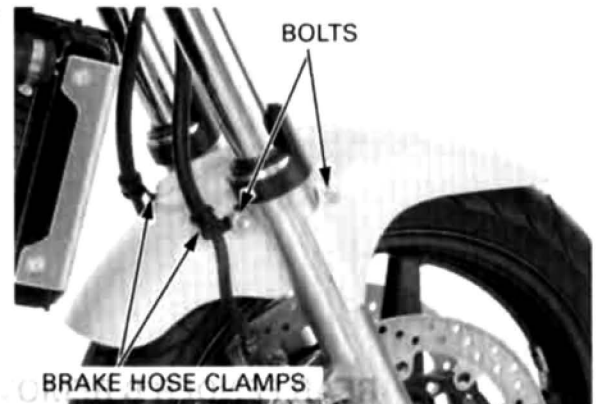
8 mm socket bolt: 26 N·m (2.7 kgf·m, 20 lbf·ft)



FRONT FENDER

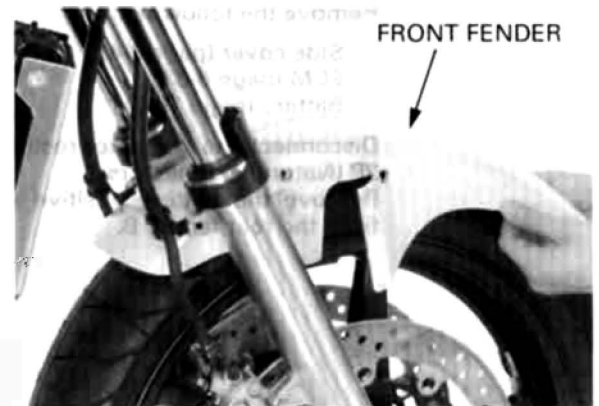
REMOVAL/INSTALLATION

Remove the front fender mounting bolts and brake hose clamps.



Pull the front fender forward and then remove it.

Installation is in the reverse order of removal.

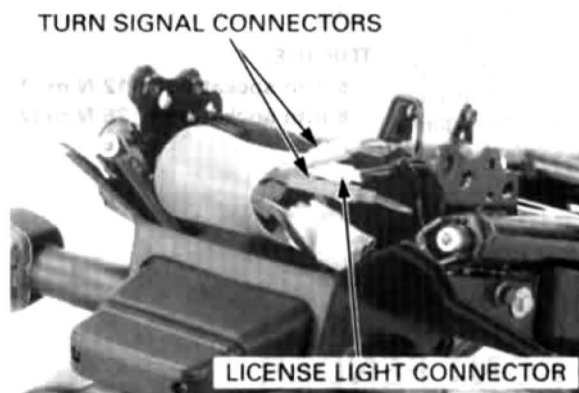


REAR FENDER

REAR FENDER A REMOVAL

Remove the rear cowl (page 3-5).

Disconnect the rear turn signal connectors and license light connector.



Remove the bolts and rear fender A.



REAR FENDER B REMOVAL

Remove the following:

- Side cover (page 3-4)
- ECM (page 6-83)
- Battery (page 16-5)

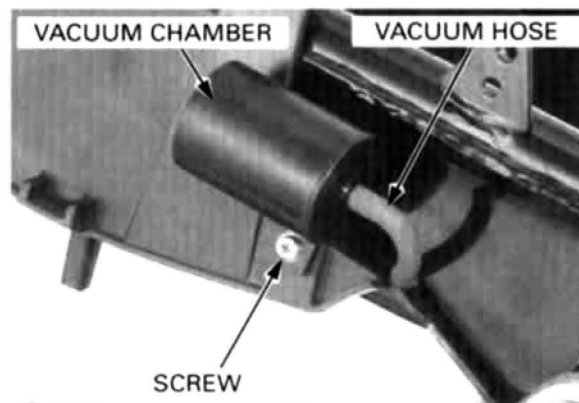
Disconnect the regulator/rectifier 3P (Natural) and 2P (Natural) connectors.

Remove the battery positive and negative cables from the rear fender B.

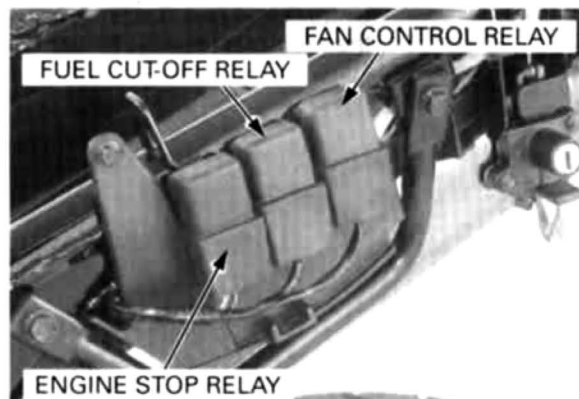


Remove the vacuum hose from the variable intake solenoid valve vacuum chamber.

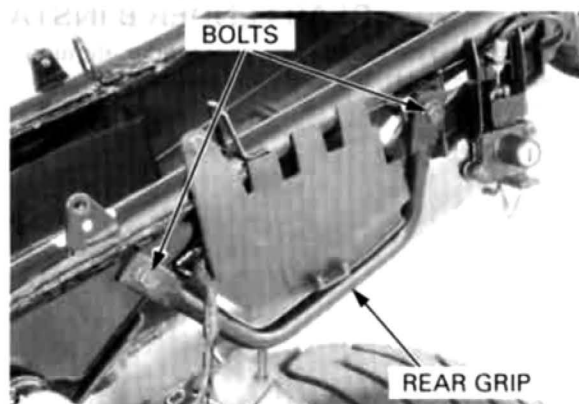
Remove the screw and vacuum chamber.



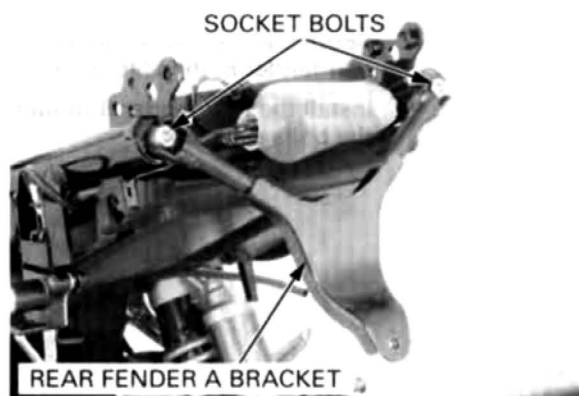
Remove the fan control relay, fuel cut-off relay and engine stop relay from the rear fender bosses.



Remove the bolts and rear grip.



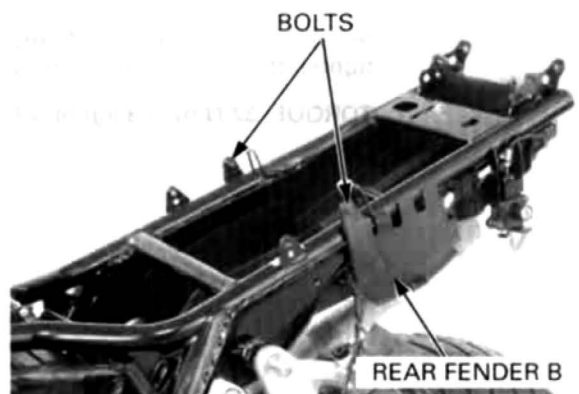
Remove the socket bolts and rear fender A bracket.



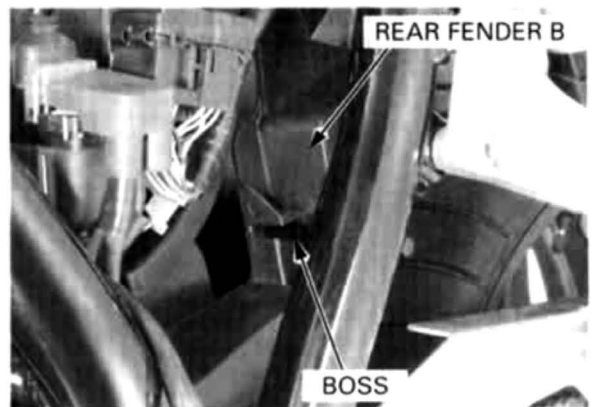
Remove the two rear fender mounting bolts.

Lower the rear fender B.

Be careful not to damage the wire harness and regulator/rectifier.



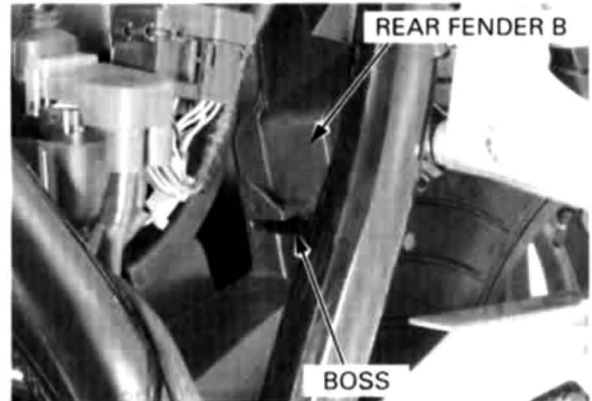
Unhook the rear fender B from the seat rail bosses, then remove the rear fender backward.



REAR FENDER B INSTALLATION

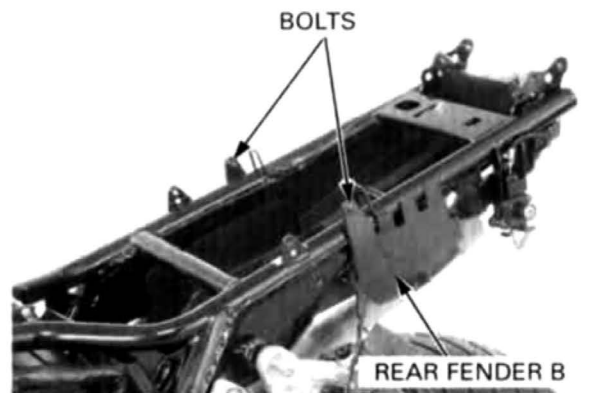
While installing the rear fender, route the wire harness properly (page 1-23).

Install the rear fender aligning its lower groove with the seat rail bosses.



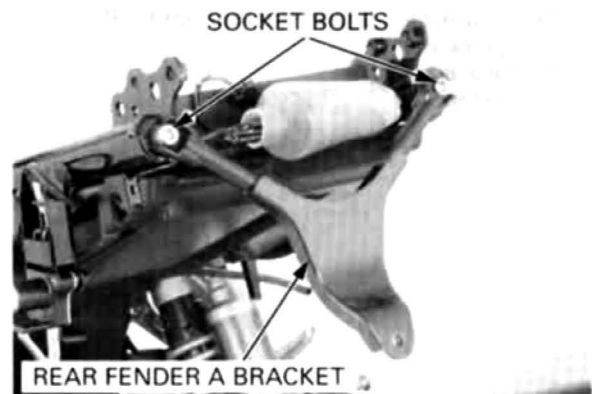
Route the main wire harness into the groove of the rear fender B, then lift up the rear fender B.

Install the rear fender B mounting bolts and tighten the bolts securely.

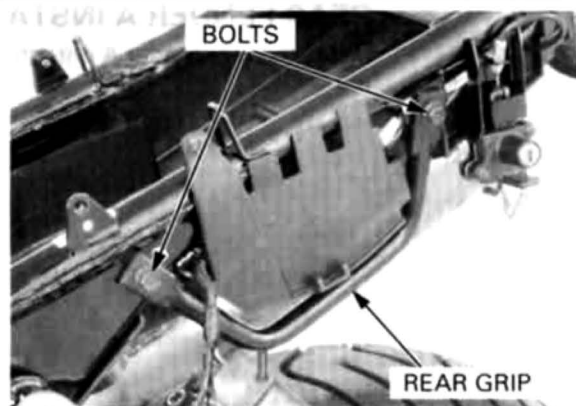


Install the rear fender A mounting bracket and tighten the socket bolts to the specified torque.

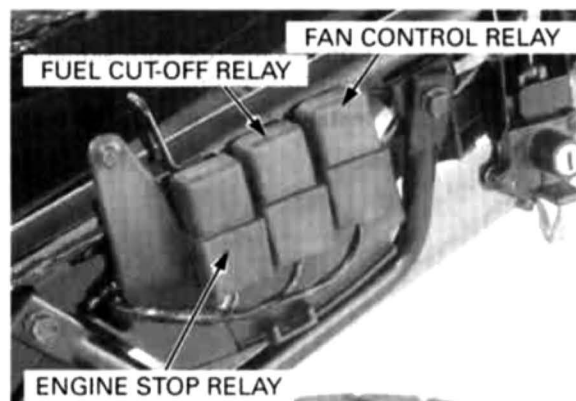
TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



Install the rear grip and tighten the bolts securely.

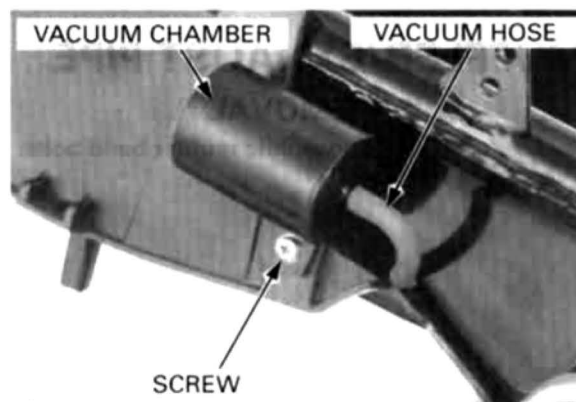


Install the fan control relay, fuel cut-off relay and engine stop relay onto the rear fender bosses.



Install the variable intake air control valve vacuum chamber and tighten the screw.

Route the variable intake air control valve vacuum hose properly, then connect it to the vacuum chamber.



Route the regulator/rectifier wire and battery cables properly

Route the battery positive and negative cables into the rear fender B.

Connect the regulator/rectifier 3P (Natural) and 2P (Natural) connectors.

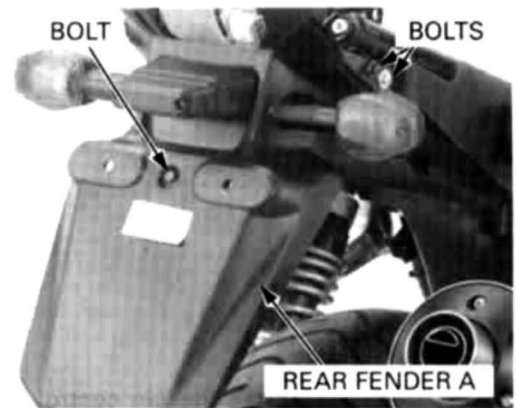
Install the following:

- Battery (page 16-5)
- ECM (page 6-83)
- Side cover (page 3-4)



REAR FENDER A INSTALLATION

Install the rear fender A onto the bracket and tighten the bolts.



Connect the rear turn signal connectors and license light connector.

Install the rear cowl (page 3-7).

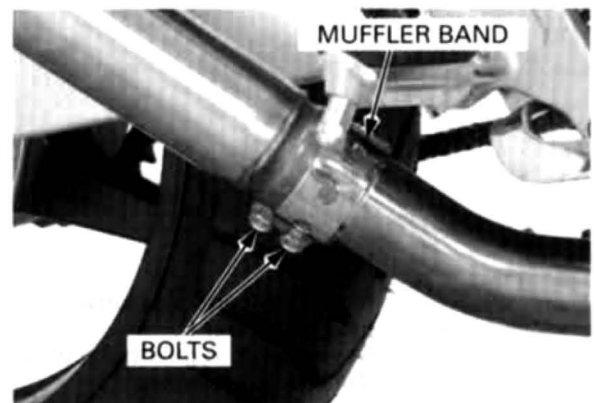
TURN SIGNAL CONNECTORS



MUFFLER/EXHAUST PIPE

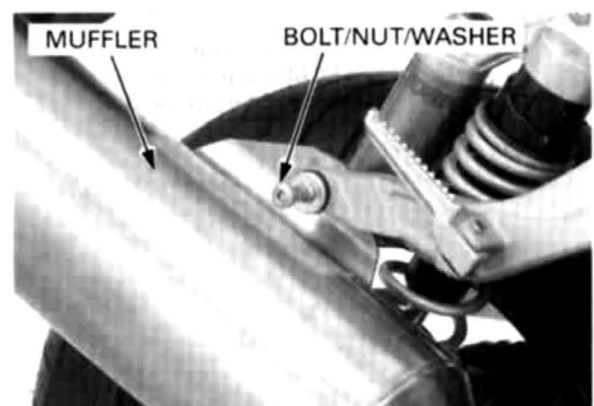
REMOVAL

Loosen the muffler band bolts.

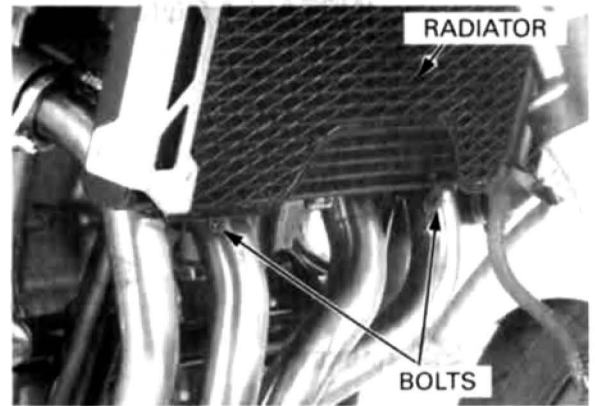


Remove the muffler mounting bolt/nut and washer, then remove the muffler.

Remove the gasket.



Remove the radiator lower mounting bolts, then move the radiator forward.

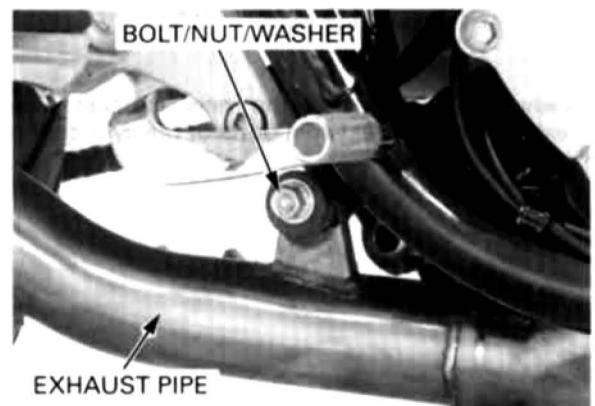


Remove the exhaust pipe joint cap nuts.

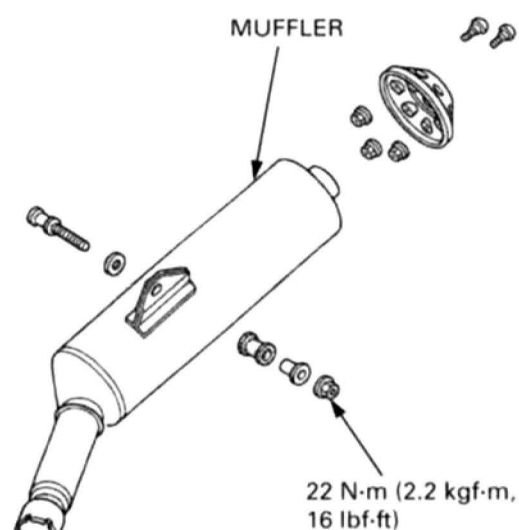
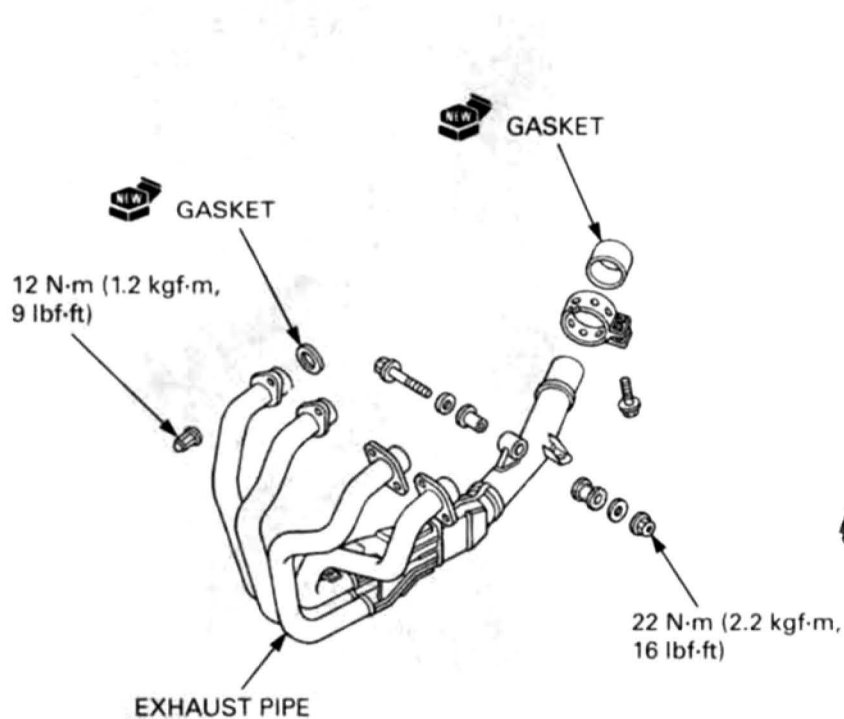


Remove the exhaust pipe mounting bolt/nut and washer, then remove the exhaust pipe.

Remove the exhaust pipe gaskets.



INSTALLATION



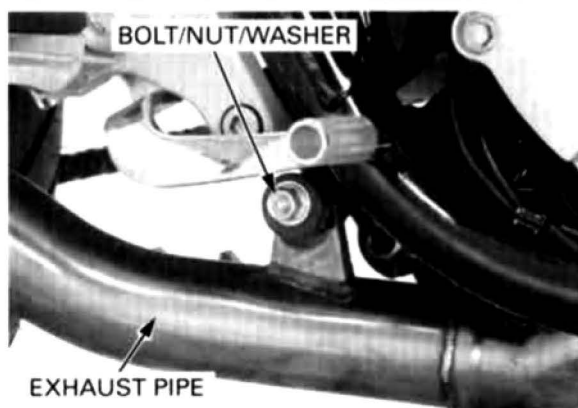
Always replace the exhaust pipe gaskets with new ones.

Install the new exhaust pipe gaskets onto the exhaust ports of the cylinder head.



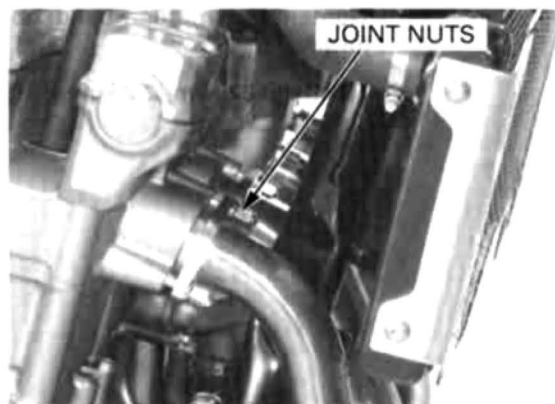
Install the washer, bolt and nut properly.

Install the exhaust pipe, temporarily install the exhaust pipe joint cap nuts, mounting washer and mounting bolt/nut.



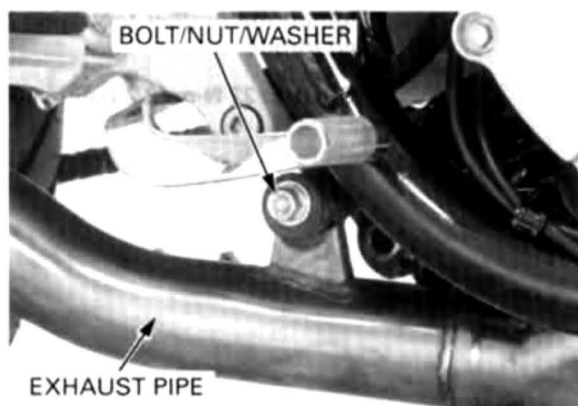
First tighten the exhaust pipe joint cap nuts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

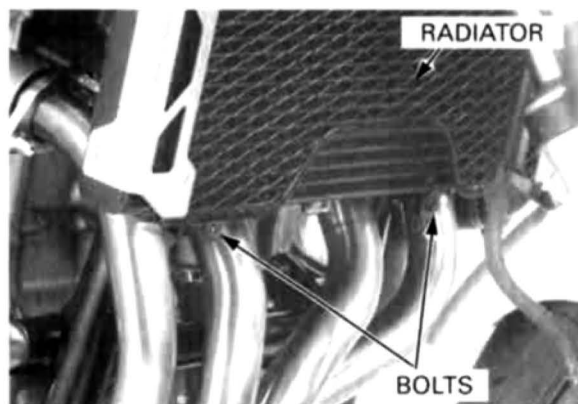


Tighten the exhaust pipe mounting bolt/nut.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

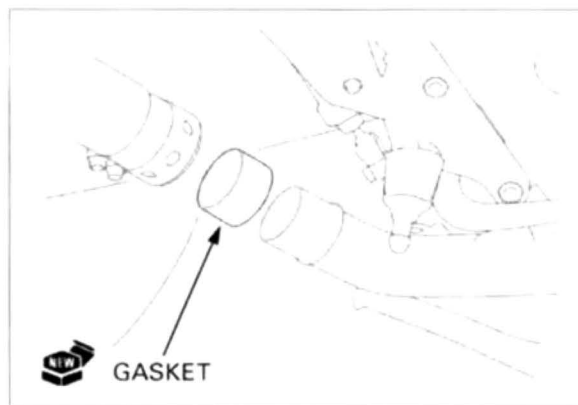


Install and tighten the radiator lower mounting bolts.



Install the new gasket onto the exhaust pipe as shown.

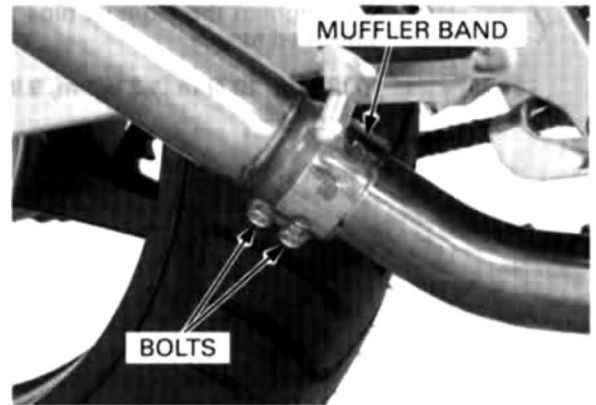
Install the muffler and temporarily install the muffler mounting bolt/nut.



FRAME/BODY PANELS/EXHAUST SYSTEM

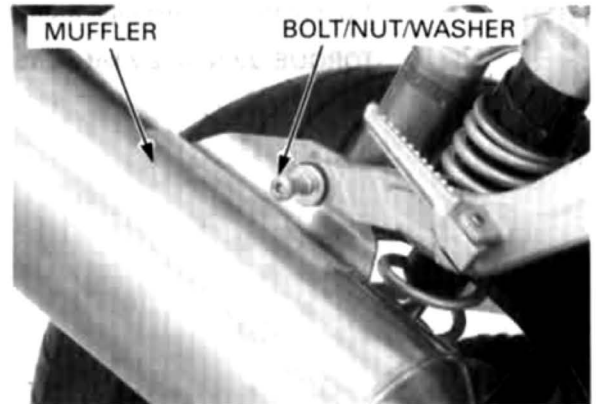
Tighten the muffler band bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Tighten the muffler mounting bolt/nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



SERVICE INFORMATION	4-2	DRIVE CHAIN	4-20
MAINTENANCE SCHEDULE	4-4	DRIVE CHAIN SLIDER	4-24
FUEL LINE	4-5	BRAKE FLUID	4-25
THROTTLE OPERATION	4-6	BRAKE PAD WEAR	4-26
CHOKE OPERATION	4-6	BRAKE SYSTEM	4-26
AIR CLEANER	4-7	BRAKE LIGHT SWITCH	4-27
CRANKCASE BREATHER	4-7	HEADLIGHT AIM	4-27
SPARK PLUG	4-8	CLUTCH SYSTEM/CLUTCH FLUID	4-28
VALVE CLEARANCE	4-9	SIDE STAND	4-29
ENGINE OIL/OIL FILTER	4-14	SUSPENSION	4-29
ENGINE IDLE SPEED	4-17	NUTS, BOLTS, FASTENERS	4-32
RADIATOR COOLANT	4-17	WHEELS/TIRES	4-33
COOLING SYSTEM	4-18	STEERING HEAD BEARINGS	4-33
SECONDARY AIR SUPPLY SYSTEM	4-19		

SERVICE INFORMATION

GENERAL

- Place the motorcycle on a level ground before starting any work.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in and enclosed area.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 – 4 mm (1/16 – 3/16 in)
Spark plug (option)	NGK		DPR8EA-9 (DPR9EA-9)
	DENSO		X24EPR-U9 (X27EPR-U9)
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance	IN		0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX		0.22 ± 0.03 mm (0.009 ± 0.001 in)
Engine oil capacity	After draining		3.8 liter (4.0 US qt, 3.3 Imp qt)
	After draining/oil filter change		4.0 liter (4.2 US qt, 3.5 Imp qt)
Recommended engine oil			Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40
Engine idle speed			1,000 ± 100 min ⁻¹ (rpm)
Drive chain slack			25 – 35 mm (1.0 – 1.4 in)
Recommended brake fluid			DOT 4
Tire size		Front	120/70 ZR 17 M/C (58W)
		Rear	180/55 ZR 17 M/C (73W)
Tire brand	Dunlop	Front	D220FSTK
		Rear	D220STK
	Michelin	Front	MACADAM 100XC
		Rear	MACADAM 100XC
Tire air pressure	Driver only	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

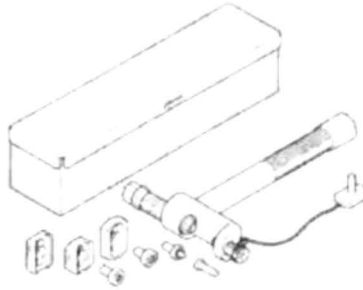
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Crankshaft hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Spark plug	15 N·m (1.5 kgf·m, 11 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Engine oil drain plug	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the O-ring
Rear axle nut	113 N·m (11.5 kgf·m, 83 lbf·ft)	U-nut
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Final driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Rear master cylinder push rod joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	

TOOLS

Oil filter wrench
07HAA-PJ70101



Drive chain tool set
07HMH-MR10103



Tensioner stopper
07NMG-MY90101



MAINTENANCE

MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult their authorized Honda dealer.

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ↓	ODOMETER READING (NOTE 1) →								REFER TO PAGE
			X1,000 km	1	6	12	18	24	30	36	
			X1,000 mi	0.6	4	8	12	16	20	24	
			Months		6	12	18	24	30	36	
* FUEL LINE						I		I		I	4-5
* THROTTLE OPERATION						I		I		I	4-5
* CHOKE OPERATION						I		I		I	4-6
AIR CLEANER		NOTE 2					C			C	4-7
CRANKCASE BREATHER		NOTE 3			I	I	I	I	I	I	4-7
SPARK PLUG						I		R		I	4-8
* VALVE CLEARANCE								I			4-9
ENGINE OIL				R		R		R		R	4-14
ENGINE OIL FILTER				R		R		R		R	4-15
* ENGINE IDLE SPEED				I		I		I		I	4-17
RADIATOR COOLANT		NOTE 4				I		I		R	4-17
* COOLING SYSTEM						I		I		I	4-18
* SECONDARY AIR SUPPLY SYSTEM						I		I		I	4-19
DRIVE CHAIN											4-20
DRIVE CHAIN SLIDER						I		I		I	4-24
BRAKE FLUID		NOTE 4			I	I	R	I	I	R	4-25
BRAKE PAD WEAR					I	I	I	I	I	I	4-26
BRAKE SYSTEM				I		I		I		I	4-26
* BRAKE LIGHT SWITCH						I		I		I	4-27
* HEADLIGHT AIM						I		I		I	4-27
CLUTCH SYSTEM						I		I		I	4-28
CLUTCH FLUID		NOTE 4			I	I	R	I	I	R	4-28
SIDE STAND						I		I		I	4-29
* SUSPENSION						I		I		I	4-29
* NUT, BOLTS, FASTENERS				I		I		I		I	4-32
** WHEELS/TIRES						I		I		I	4-33
** STEERING HEAD BEARINGS				I		I		I		I	4-33

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified

** In the interest of safety, we recommended these items be serviced only by an authorized Honda dealer

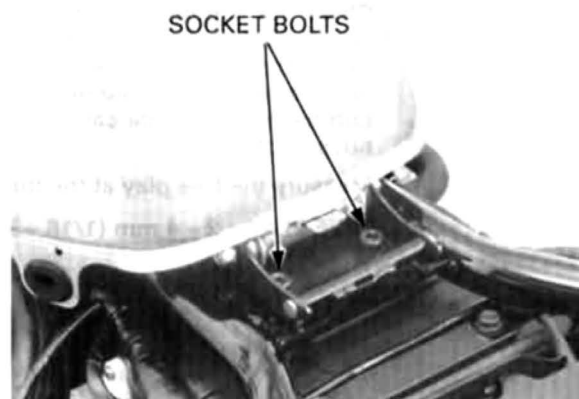
NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently if the motorcycle is ridden in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

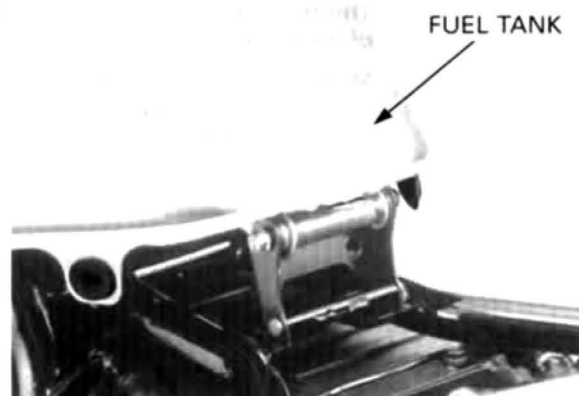
FUEL LINE

Remove the seat and side covers (page 3-4).

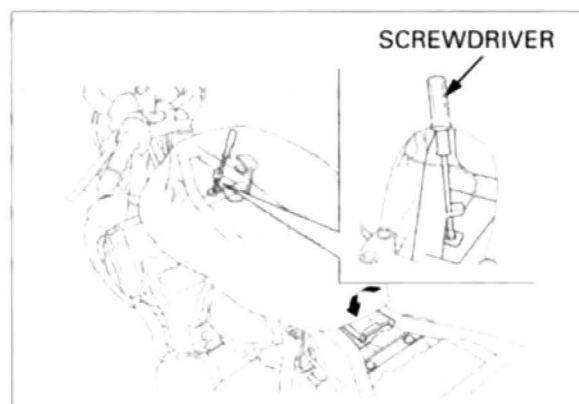
Remove the fuel tank rear bracket socket bolts.



Pull up the rear end of the fuel tank and release the tank from the cushion rubbers on the frame.



Open and support the front end of fuel tank using a equipped screwdriver as shown.



Check the fuel line for deterioration, damage or leakage. Replace the fuel line if necessary.

Install the fuel tank in the reverse order of removal.

Tighten the fuel tank rear bracket socket bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

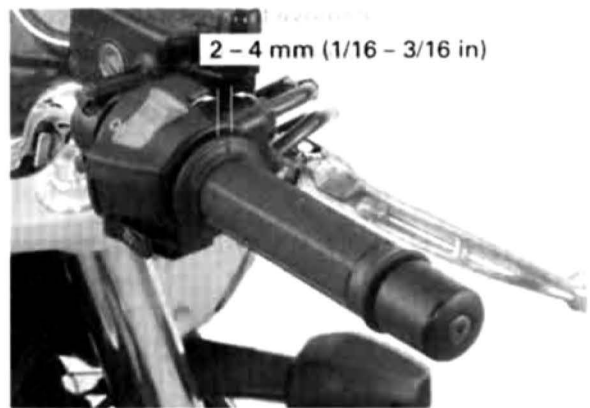


THROTTLE OPERATION

Check for smooth throttle grip full opening and automatic full closing in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked or damaged. Lubricate the throttle cables, if throttle operation is not smooth.

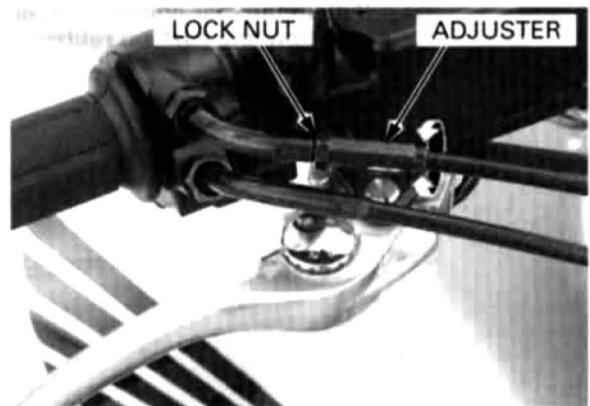
Measure the free play at the throttle grip flange.

FREE PLAY: 2 – 4 mm (1/16 – 3/16 in)



Throttle grip free play can be adjusted at either end of the throttle cable.

Minor adjustment are made with the upper adjuster. Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustments are made with the lower adjuster.

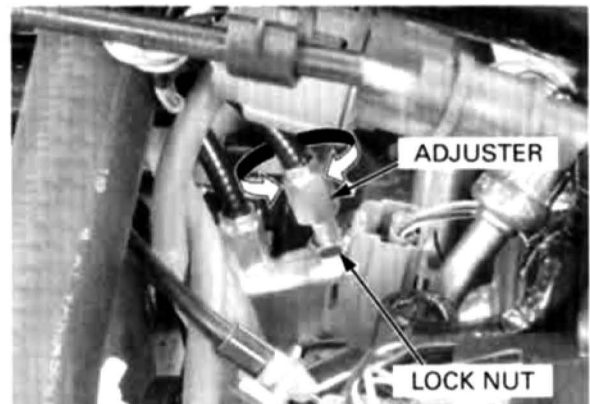
Open and support the fuel tank (page 4-5).
Remove the air cleaner side covers (page 3-5).

Adjust the free play by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.

Replace any damaged parts, if necessary.



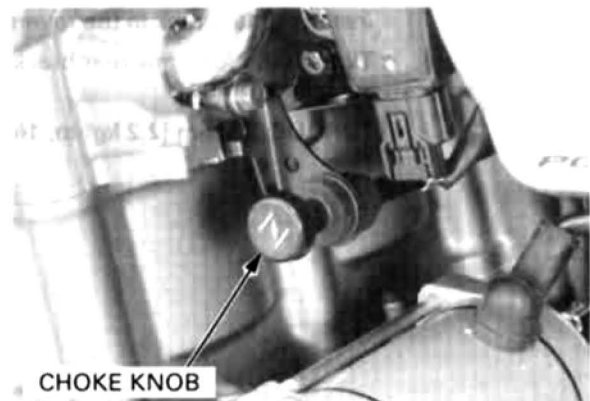
CHOKE OPERATION

This motorcycle is equipped with a bypass air volume control choke system, controlled by the starter valve.

The starter valve opens a bypass air circuit when the choke knob is pulled in.

Check for smooth operation of the choke knob.

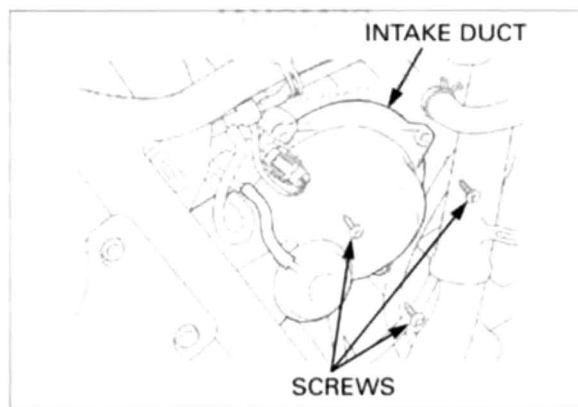
Lubricate the choke cable if the operation is not smooth.



AIR CLEANER

Remove the right side cover (page 3-4).

Remove the screws and air cleaner intake duct assembly.

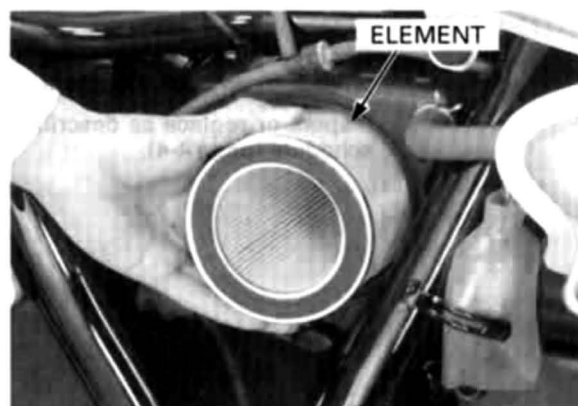


Clean the air cleaner element in accordance with the maintenance schedule (page 4-4).

If the surface of the element is dirty, remove the dust first by tapping the element gently. Then, blow away any remaining dust on the surface of the filter with compressed air from the clean side toward the dirty side.

Replace the air cleaner element any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.



CRANKCASE BREATHER

Place a drain pan under the crankcase breather hose plug.

Remove the plug from the front air cleaner housing to drain the deposits in the hose.



Reinstall the crankcase breather hose plug.

Service more frequently when riding in wet or dusty area.

Remove the plug from the rear air cleaner housing drain hose to drain the deposits in the hose.

Reinstall the crankcase breather hose plug.

Service more frequently when riding in wet or dusty area.



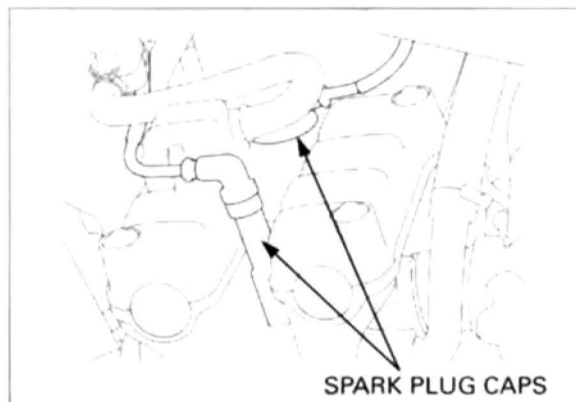
SPARK PLUG

REMOVAL

Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber

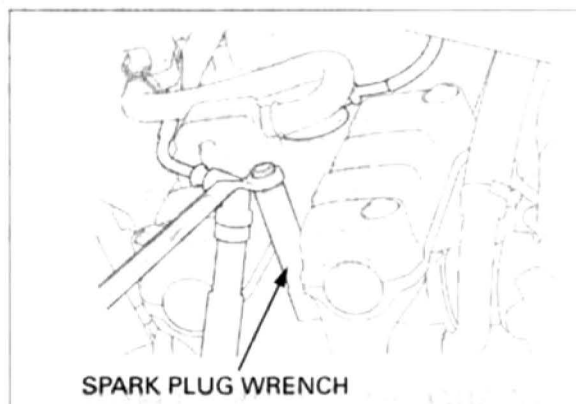
Open and support the fuel tank (page 4-5).

Remove the spark plug caps.



Remove the spark plug using a equipped spark plug wrench or an equivalent tool.

Inspect or replace as described in the maintenance schedule (page 4-4).

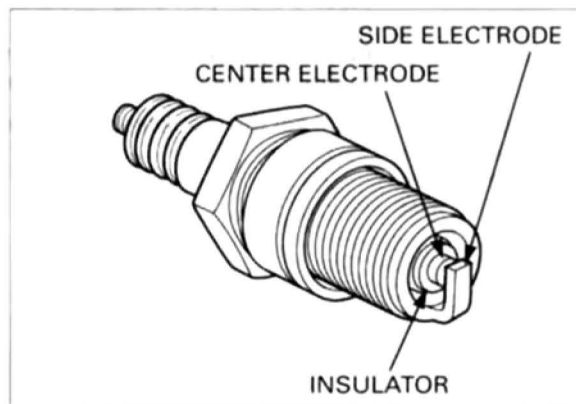


INSPECTION

Check the following and replace if necessary (recommended spark plug: page 4-2)

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration

If the electrode is contaminated with accumulated objects or dirt, replace the spark plug.



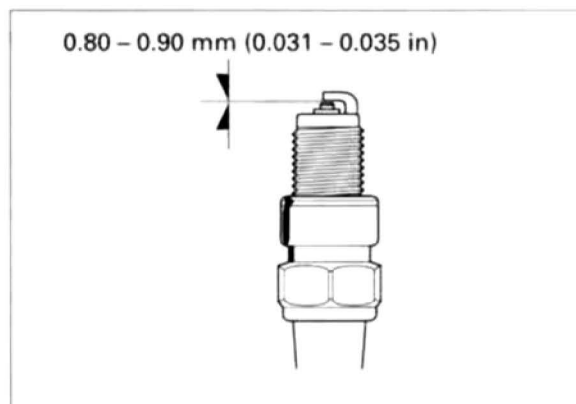
REUSING A SPARK PLUG

Clean the spark plug electrodes with a wire brush or special plug cleaner.

Check the gap between the center and side electrodes with a wire-type feeler gauge.

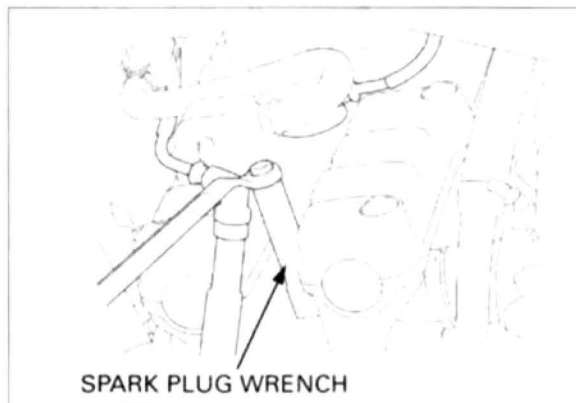
If necessary, adjust the gap by bending the side electrodes carefully.

SPARK PLUG GAP: 0.80 – 0.90 mm (0.031 – 0.035 in)



Reinstall the spark plugs in the cylinder head and hand tighten, then torque to specification.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



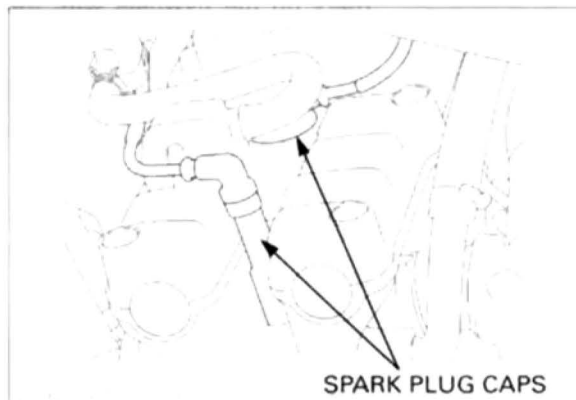
REPLACING A SPARK PLUG

Set the plug gap to specification with a wire-type feeler gauge (page 4-8).

Do not overtighten the plug

Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.

Install the spark plug caps.



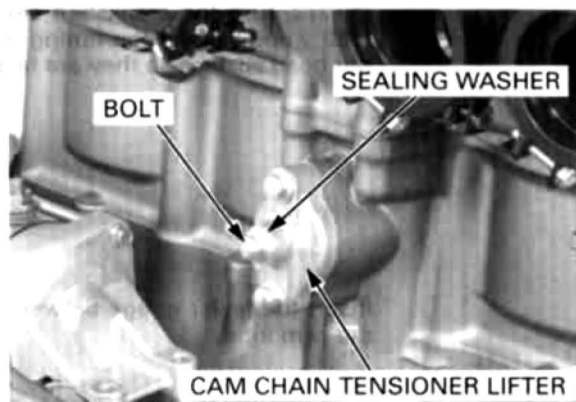
VALVE CLEARANCE

Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F)

INSPECTION

Remove the cylinder head cover (page 9-7).

Remove the cam chain tensioner lifter sealing bolt and sealing washer.

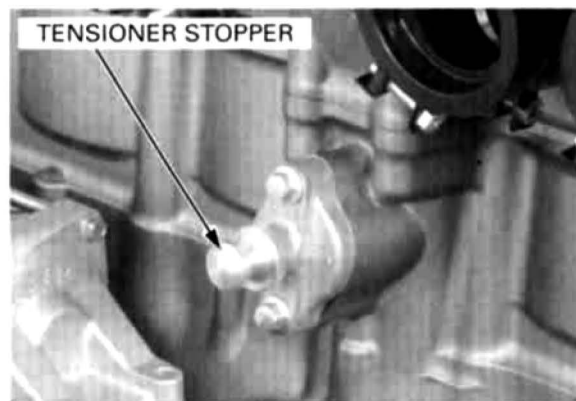


Turn the cam chain tensioner lifter shaft fully and secure it using the tensioner stopper.

TOOL:

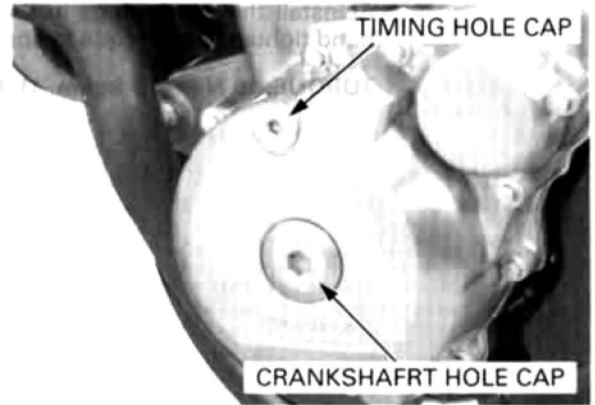
Tensioner stopper

07NMG-MY90101

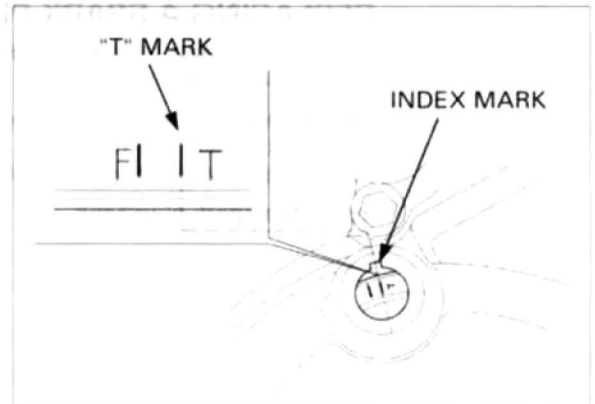


MAINTENANCE

Remove the timing hole cap, crankshaft hole cap and O-rings.

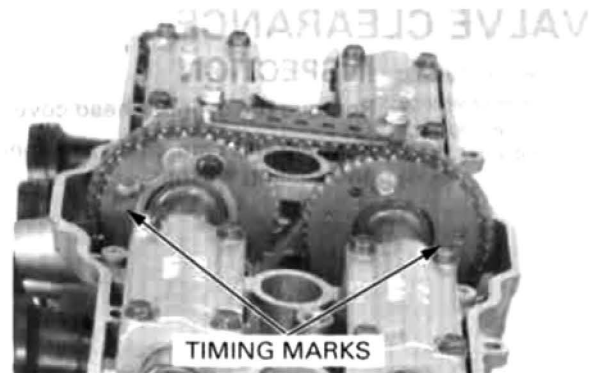


Turn the crankshaft counterclockwise, align the "T" mark on the flywheel with the index mark on the alternator cover.

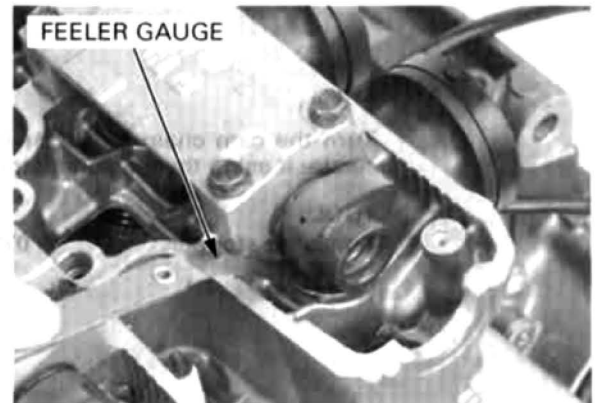


The timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprocket facing inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



Insert the feeler gauge between the valve lifter and the cam lobe.

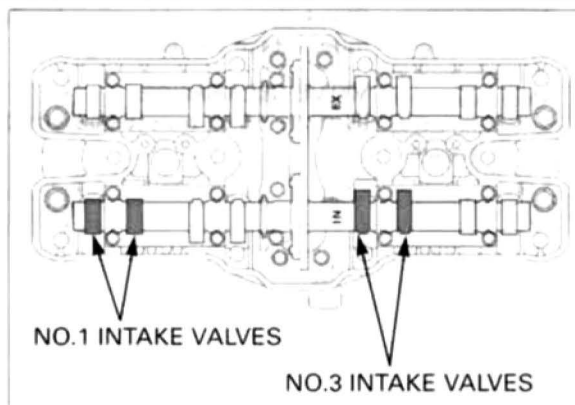


Record the clearance for each valve for reference in shim selection if adjustment is required.

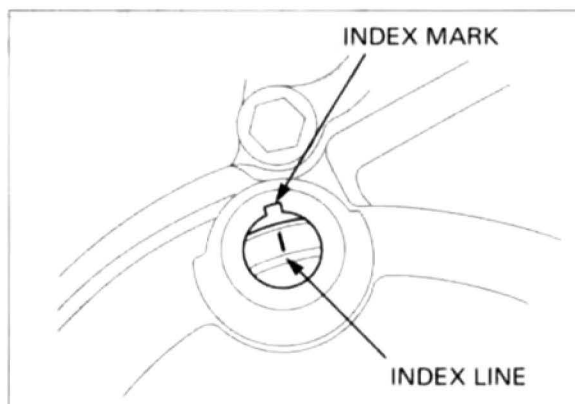
Check the valve clearance for the No.1 and No.3 cylinder intake valves using a feeler gauge.

VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



Turn the crankshaft counterclockwise 1/2 turn (180°), align the index line on the flywheel so that it is facing up as shown.

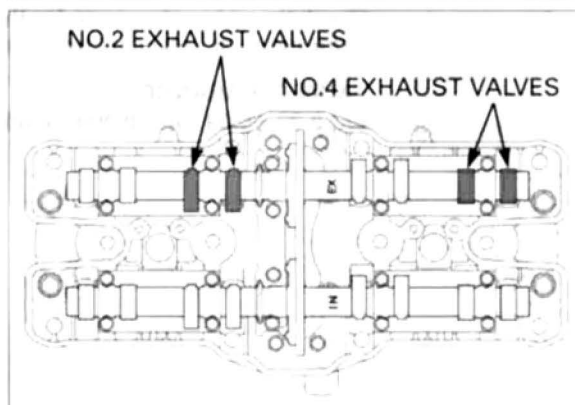


Record the clearance for each valve for reference in shim selection if adjustment is required.

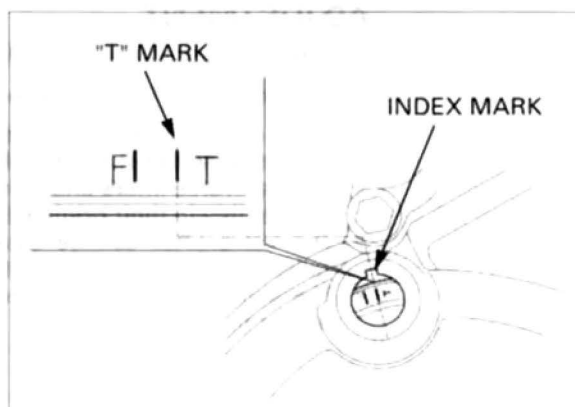
Check the valve clearance for the No.2 and No.4 cylinder exhaust valves using a feeler gauge.

VALVE CLEARANCE:

EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)



Turn the crankshaft counterclockwise 1/2 turn (180°), align the "T" mark (near the "F" mark) on the flywheel with the index mark on the alternator cover.



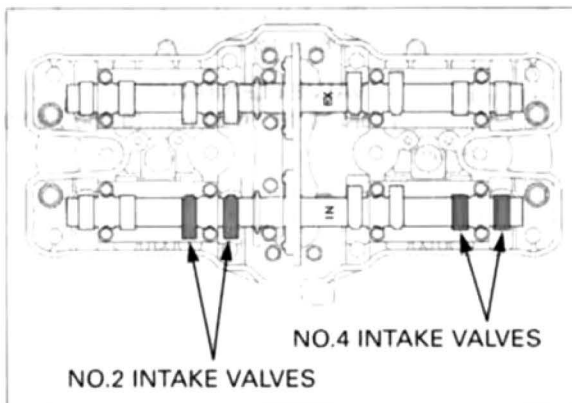
MAINTENANCE

Record the clearance for each valve for reference in shim selection if adjustment is required.

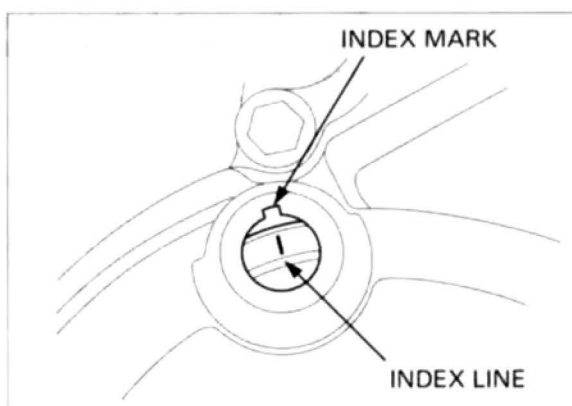
Check the valve clearance for the No.2 and No.4 cylinder intake valves using feeler gauge.

VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



Turn the crankshaft counterclockwise 1/2 turn (180°), align the index line on the flywheel so that it is facing up as shown.

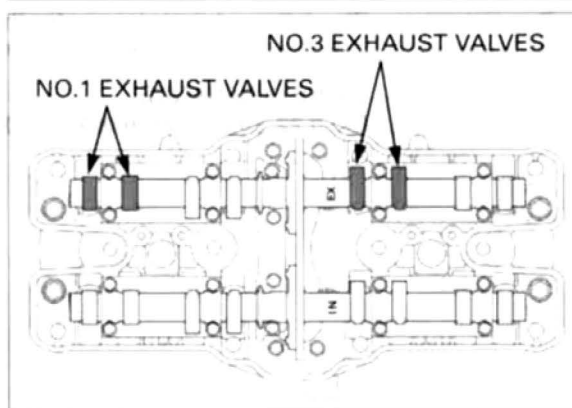


Record the clearance for each valve for reference in shim selection if adjustment is required.

Check the valve clearance for the No.1 and No.3 cylinder exhaust valves using a feeler gauge.

VALVE CLEARANCE:

EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)

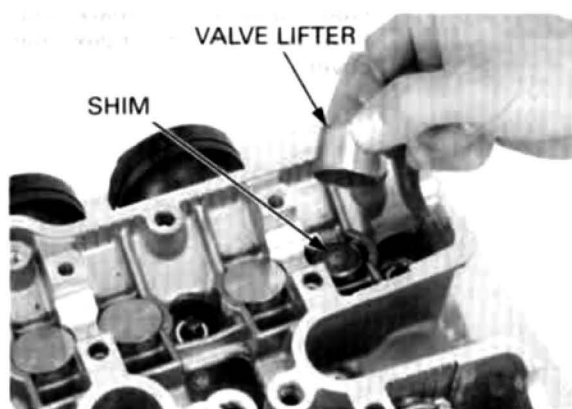


ADJUSTMENT

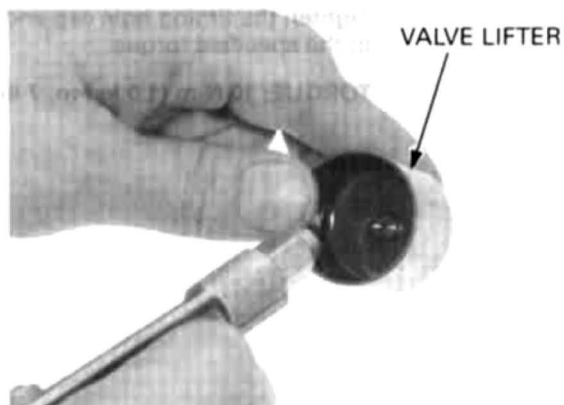
Remove the camshaft (page 9-12).

Remove the valve lifters and shims.

- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.



Clean the valve shim contact area in the valve lifter with compressed air.



Sixty-five different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.800 mm thickness shim in intervals of 0.025 mm.

Measure the shim thickness and record it.

Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

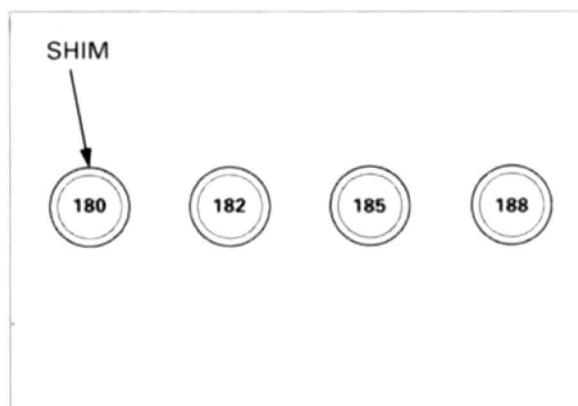
A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.800 mm.



Install the shims and valve lifters in their original locations

Install the newly selected shim on the valve retainer.

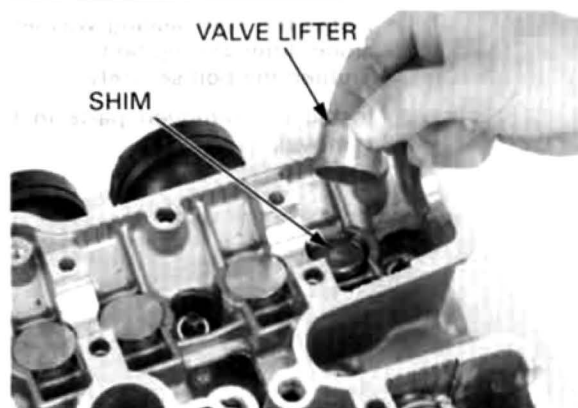
Apply molybdenum disulfide oil to the valve lifters.

Install the valve lifters into the valve lifter holes.

Install the camshaft (page 9-16).

Rotate the camshafts by rotating the crankshaft clockwise several times.

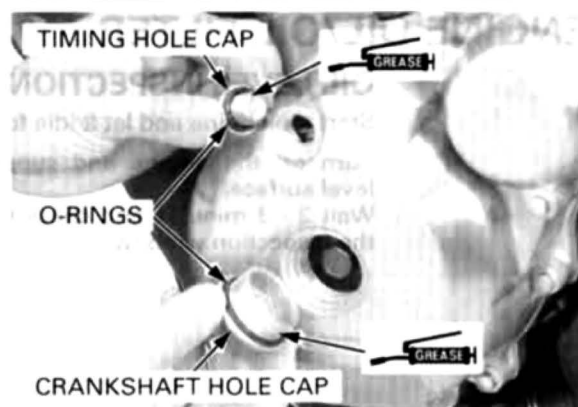
Recheck the valve clearance.



Check the O-rings are in good condition, replace them if necessary.

Apply grease to the timing hole cap and crankshaft hole cap threads

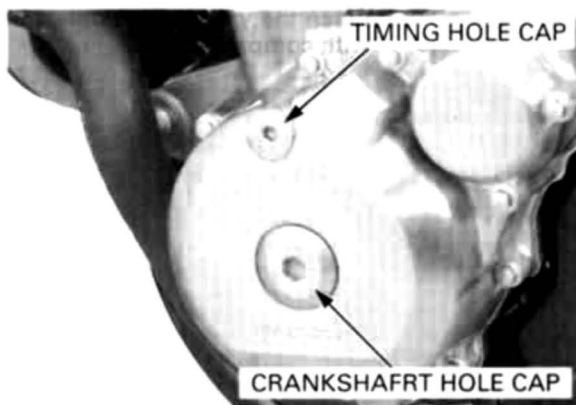
Install the timing hole cap and crankshaft hole cap.



MAINTENANCE

Tighten the timing hole cap and crankshaft hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

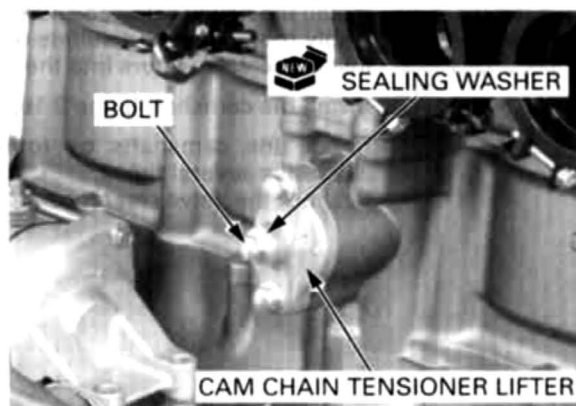


Remove the cam chain tensioner stopper.



Install the new sealing washer and cam chain tensioner lifter sealing bolt. Tighten the bolt securely.

Install the removed parts in the reverse order of removal.



ENGINE OIL/OIL FILTER

OIL LEVEL INSPECTION

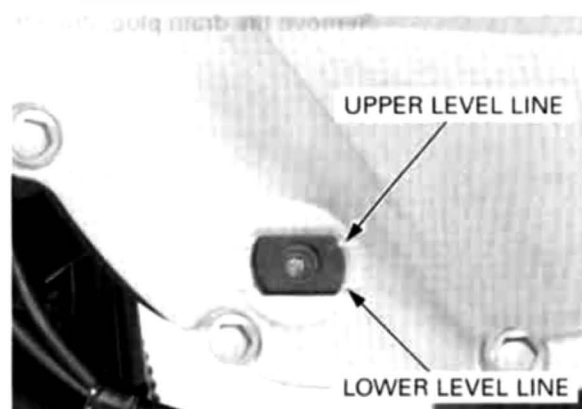
Start the engine and let it idle for 3 – 5 minutes.

Turn off the engine and support the motorcycle level surface.

Wait 2 - 3 minutes and check the oil level through the inspection window.



If the level is below the lower line, remove the oil filler cap and fill the crankcase with recommended oil up to the upper level line.



Remove the oil filler cap.



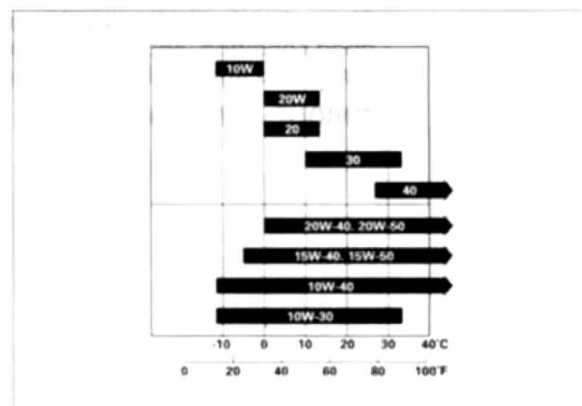
Fill the recommended engine oil up to the upper level line.

Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

RECOMMENDED ENGINE OIL:

Honda 4-stroke oil or equivalent motor oil API service classification: SE, SF or SG
Viscosity: 10W-40

Reinstall the filler cap.



ENGINE OIL & FILTER CHANGE

Warm up the engine.

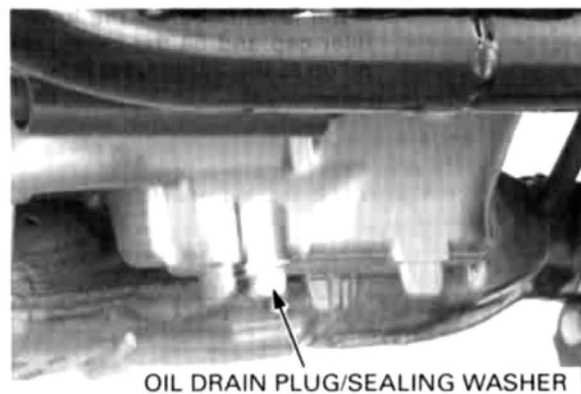
Change the engine oil with the warm and the motorcycle on level ground to assure complete draining.

Stop the engine and remove the oil filler cap.



MAINTENANCE

Remove the drain plug, drain the oil completely.

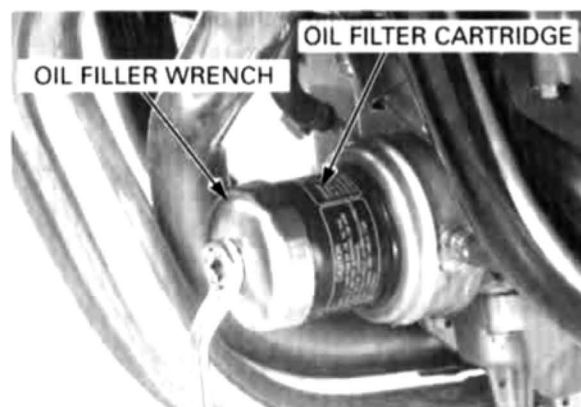


Remove and discard the oil filter cartridge using the special tool.

TOOL:

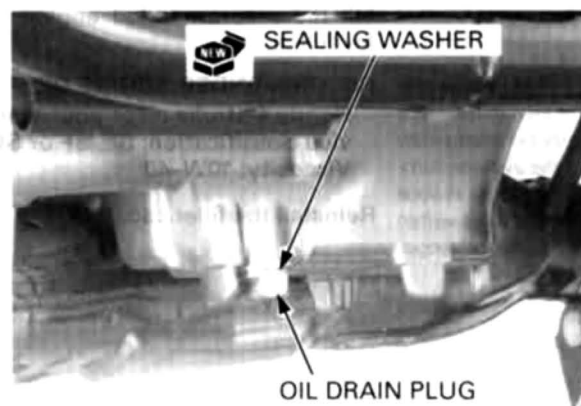
Oil filter wrench

07HAA-PJ70101

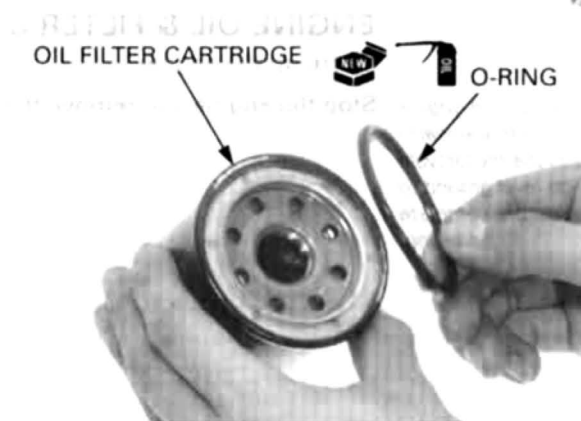


Check that the sealing washer on the drain bolt is in good condition, and replace if necessary. Install and tighten the drain plug.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



Apply clean engine oil to the new oil filter O-ring.

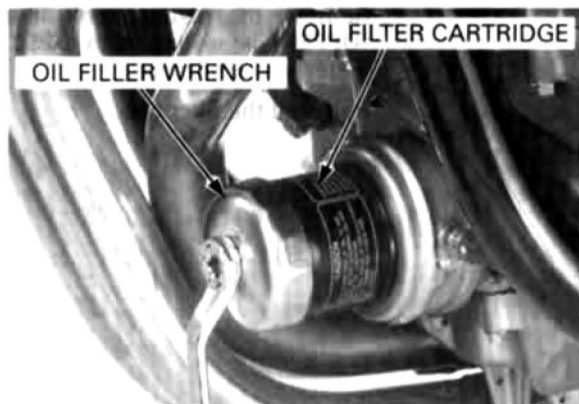


Install the new oil filter and tighten it to the specified torque.

TOOL:

Oil filter wrench **07HAA-PJ70101**

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



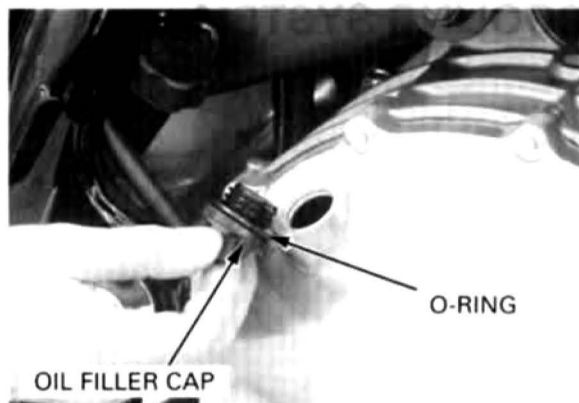
Fill the crankcase with recommended engine oil.

OIL CAPACITY:

3.7 liter (3.9 US qt, 3.3 Imp qt) after draining
3.9 liter (4.1 US qt, 3.4 Imp qt) after draining/filter change

Install the oil filler cap.

Start the engine and let it idle for 2 to 3 minutes.
 Stop the engine and recheck the oil level.
 Make sure there are no oil leaks.



ENGINE IDLE SPEED

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Warm up the engine for about ten minutes.

Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,000 ± 100 min⁻¹ (rpm)



RADIATOR COOLANT

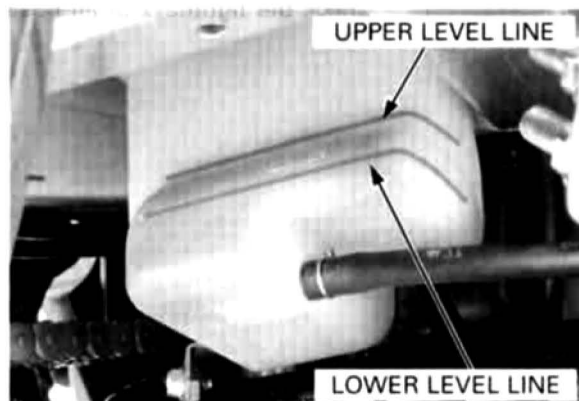
Check the coolant level of the reserve tank with the engine running at normal operating temperature.

The level should be between the "UPPER" and "LOWER" level lines.

If necessary, add recommended coolant.

RECOMMENDED ANTIFREEZE:

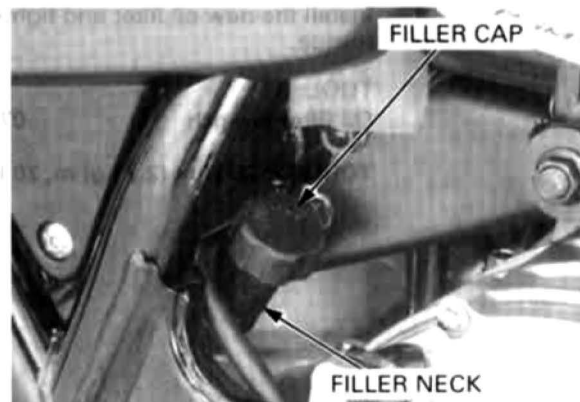
High quality ethylene glycol antifreeze containing corrosion protection inhibitors.



MAINTENANCE

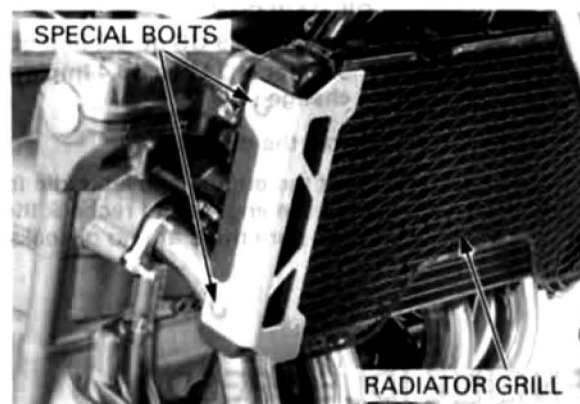
Remove the reserve tank filler cap and fill to the "UPPER" level line with 50/50 mixture of distilled water and antifreeze.

Reinstall the filler cap.



COOLING SYSTEM

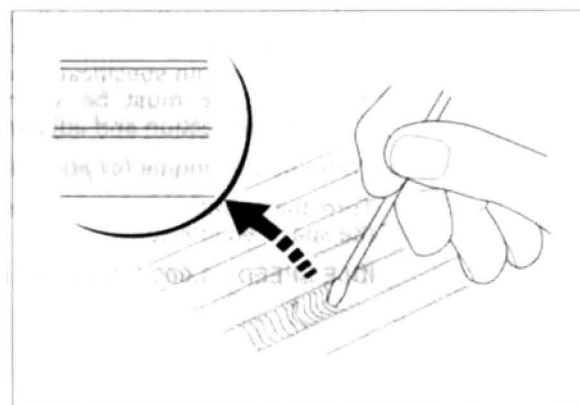
Remove the special bolts and radiator grill.



Check the radiator air passages for clogging or damage.

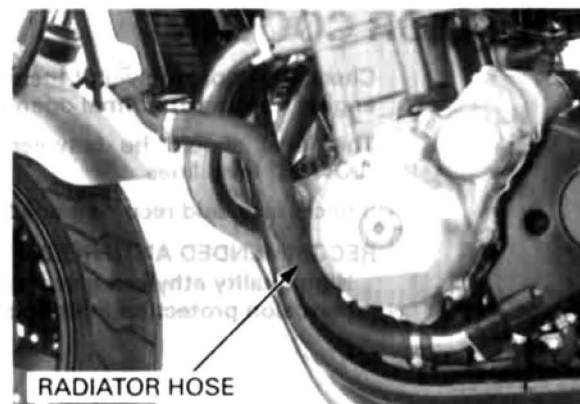
Straighten bend fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



Inspect the radiator hoses for cracks or deterioration, and replace if necessary.

Check the tightness of all hose clamps and fasteners.



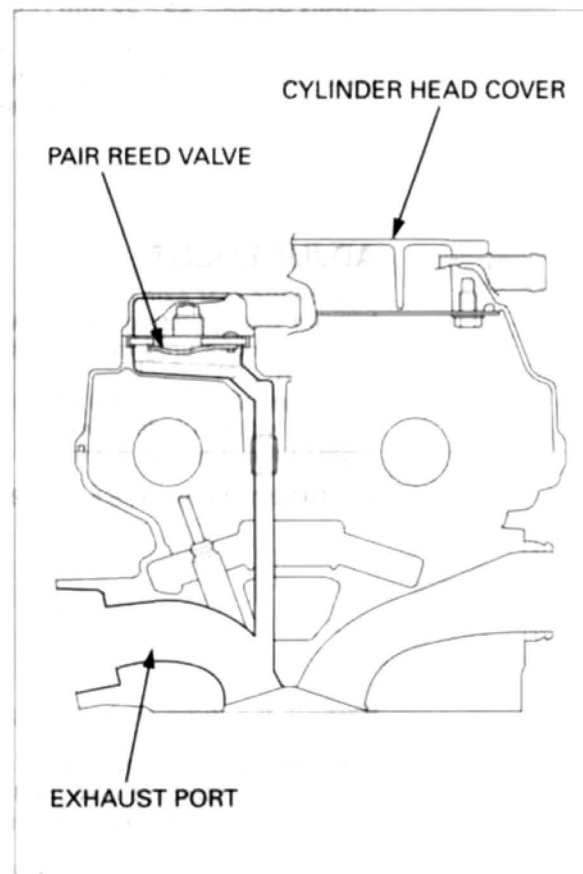
SECONDARY AIR SUPPLY SYSTEM

- This model is equipped built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

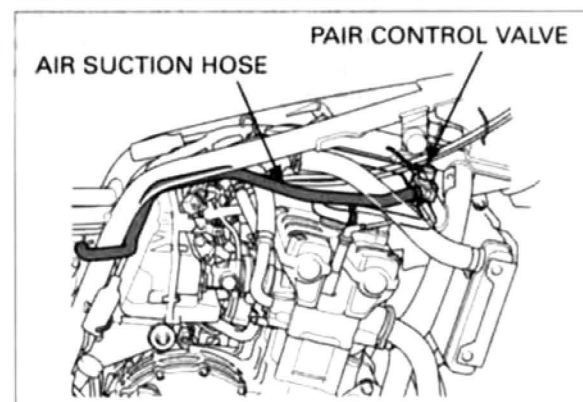
Open and support the front end of the fuel tank (page 4-5).

If the hoses show any signs of heat damage, inspect the PAIR check valve in the PAIR reed valve cover for damage.

Check the PAIR (pulse secondary air injection) tubes between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.



Check the air suction hose between the air cleaner housing and PAIR control solenoid valve for deterioration, damage or loose connections. Make sure that the hoses are not kinked, pinched or cracked.



DRIVE CHAIN

Never inspect and adjust the drive chain while the engine is running

DRIVE CHAIN SLACK INSPECTION

NOTICE

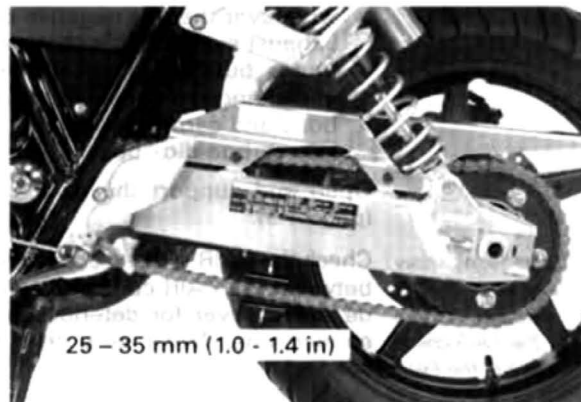
Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.

Turn the ignition switch OFF, place the motorcycle on its center stand and shift the transmission into neutral.

Check the slack in the drive chain lower run midway between the sprockets.

CHAIN SLACK: 25 – 35 mm (1.0 – 1.4 in)

Lubricate the drive chain with #80 – 90 gear oil or chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



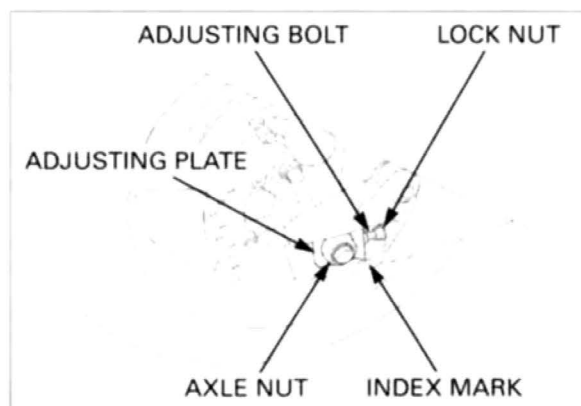
ADJUSTMENT

Loosen the rear axle nut.

Loosen the adjusting bolt lock nut and turn both adjusting bolts until the correct drive chain slack is obtained.

Make sure the front edge of both adjusting plate are aligned with the index mark on the swingarm. Tighten the rear axle nut to the specified torque.

TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)

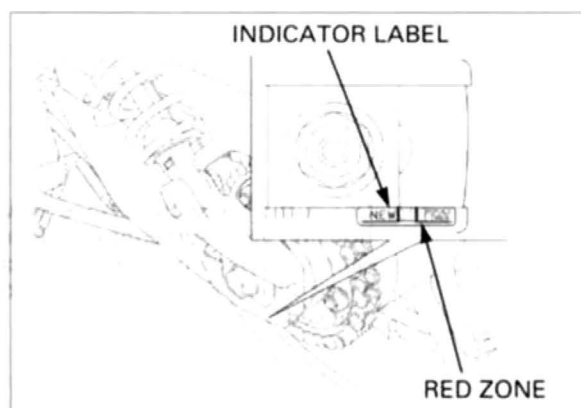


Recheck the drive chain slack and free wheel rotation.

Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

Check the drive chain wear indicator label attached on the left side of the swingarm.

If the swingarm index mark reaches red zone of the indicator label, replace the drive chain with a new one (page 4-22).



CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.

NON-FLAMMABLE OR HIGH
FLASH POINT SOLVENT

CLEAN

SOFT BRASH

WIPE AND DRY

Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

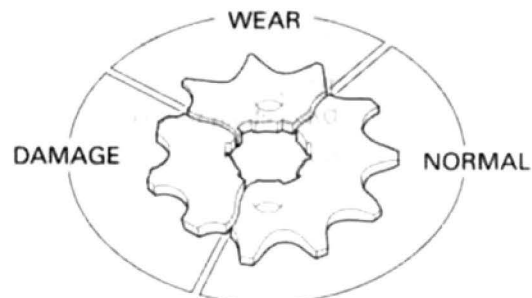
LUBRICATE

#80 – 90 GEAR OIL OR
DRIVE CHAIN LUBRICANT

SPROCKETS INSPECTION

Inspect the drive and driven sprocket teeth for wear or damage, replace if necessary.

Never use a new drive chain on worn sprockets. Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



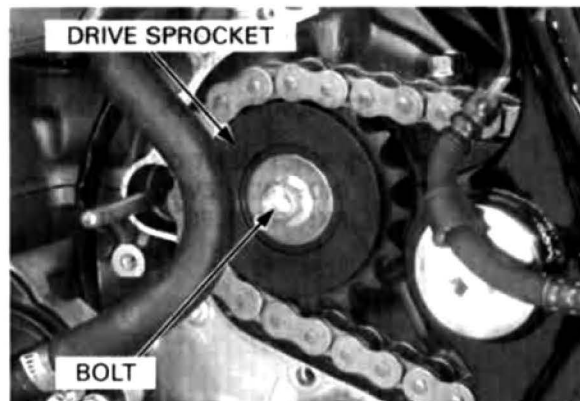
Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

TORQUE:

Drive sprocket bolt: 54 N·m (5.5 kg·m, 40 lbf·ft)

Driven sprocket nut: 108 N·m (11.0 kgf·m, 80 lbf·ft)



MAINTENANCE

REPLACEMENT

This motorcycle uses a drive chain with a staked master link.

Loosen the drive chain (page 4-20).

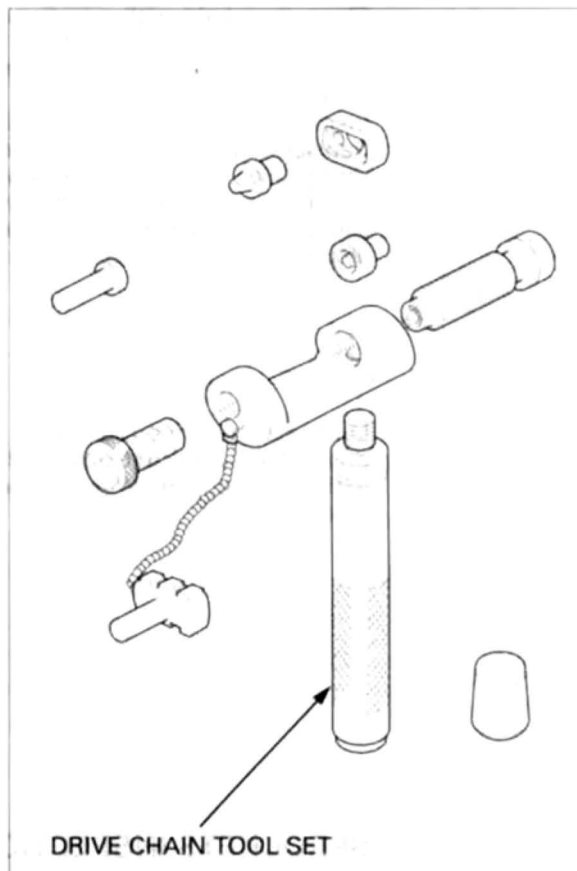
Assemble the special tool as shown.

TOOL:

Drive chain tool set

07HMH-MR10103

When using the special tool, follow the manufacturer's instruction.



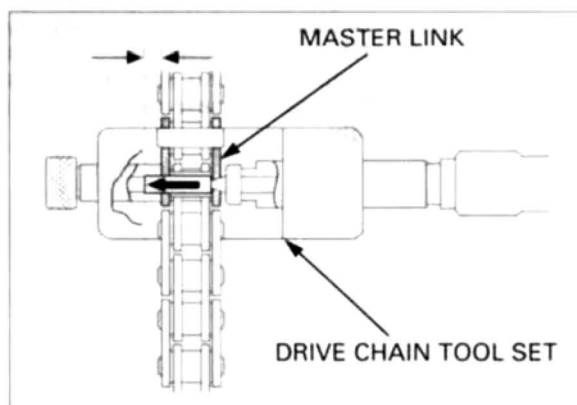
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103

Remove the drive chain.



Include the master link when you count the drive chain links.

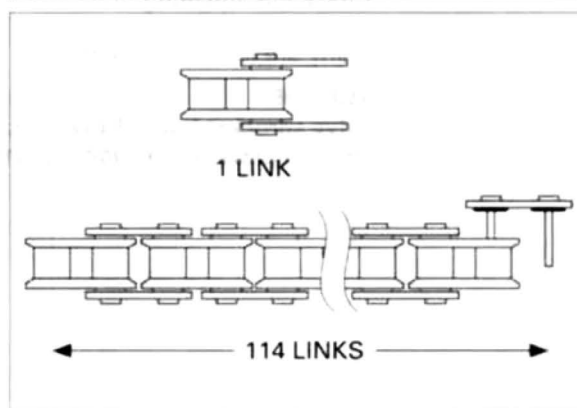
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

STANDARD LINKS: 114 LINKS

REPLACEMENT CHAIN

DID: DID50ZVM2-114LE

RK: RK50LFOZ2-114LE

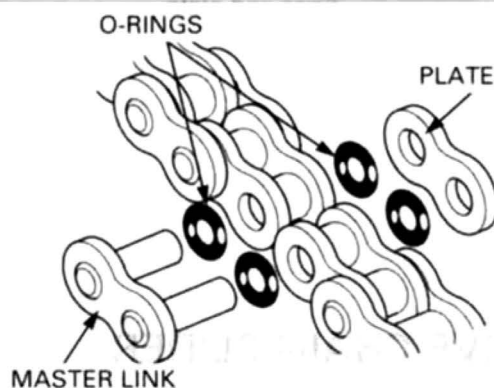


NOTICE

Never reuse the old drive chain, master link, master link plate and O-rings.

Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside

Assemble the new master link, O-rings and plate.

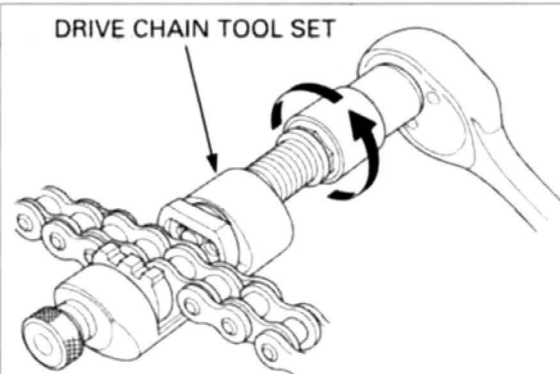


Assemble and set the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103



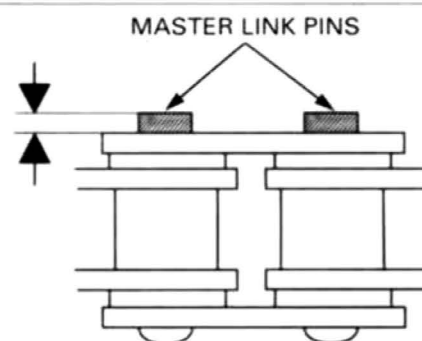
Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH::

DID: 1.15 – 1.55 mm (0.045 – 0.061 in)

RK: 1.2 – 1.4 mm (0.05 – 0.06 in)

Stake the master link pins.

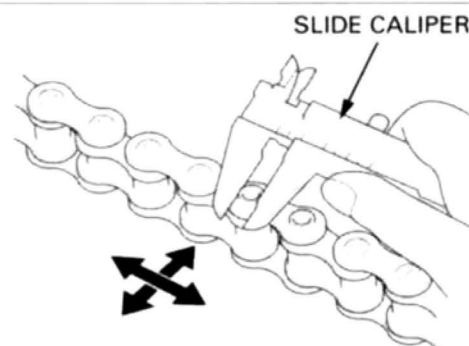


Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

DIAMETER OF THE STAKED AREA:

DID: 5.50 – 5.80 mm (0.217– 0.228 in)

RK: 5.55 – 5.85 mm (0.219 – 0.230 in)

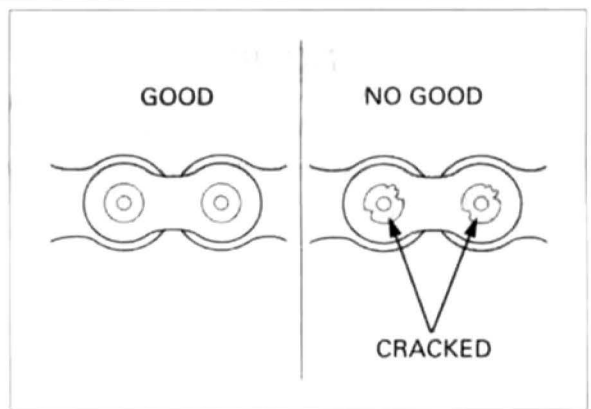


MAINTENANCE

A drive chain with a clip-type master link must not be used

After staking, check the staked area of the master link for cracks.

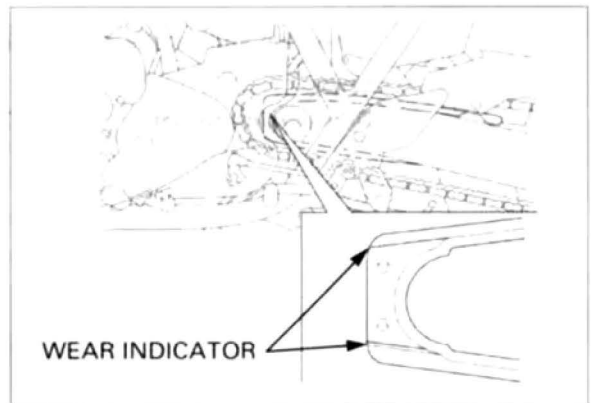
If there is any cracking, replace the master link, O-rings and plate.



DRIVE CHAIN SLIDER

Inspect the drive chain slider for excessive wear or damage.

If it is worn to the wear indicator, replace the drive chain slider.



BRAKE FLUID

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

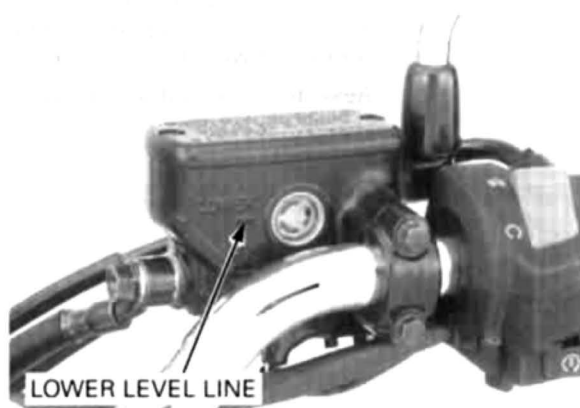
NOTICE

Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

When the fluid level is low, check the brake pads for wear (page 4-26). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 4-26).

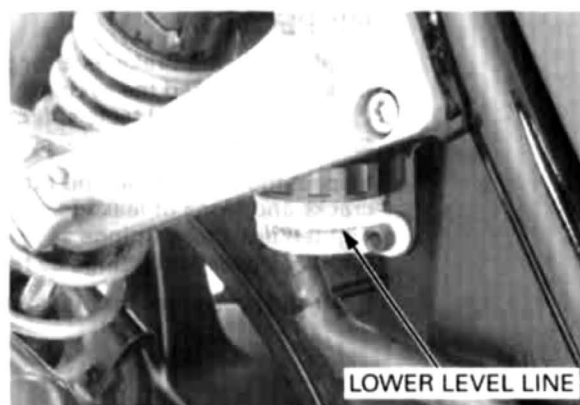
FRONT BRAKE

Turn the handlebar so that the reservoir is level and check the front brake fluid reservoir level. If the level is near the lower level line, check the brake pad wear (page 4-26).



REAR BRAKE

Check the rear brake fluid reservoir level. If the level is near the lower level line, check the brake pad wear (page 4-26).



BRAKE PAD WEAR

FRONT BRAKE PADS

Check the brake pad for wear.
Replace the brake pads if either pad is worn to the bottom of wear limit groove.

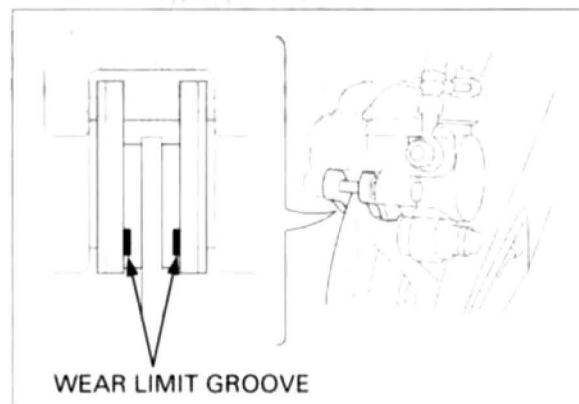
Refer to brake pad replacement (page 15-9).



REAR BRAKE PADS

Check the brake pad for wear.
Replace the brake pads if either pad is worn to the bottom of wear limit groove.

Refer to brake pad replacement (page 15-11).



BRAKE SYSTEM

INSPECTION

Firmly apply the brake lever or pedal, and check that no air has entered the system.
If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

Tighten any loose fittings.

Replace hoses and fittings as required.

Refer the procedure for brake bleeding (page 15-8).



BRAKE LEVER ADJUSTMENT

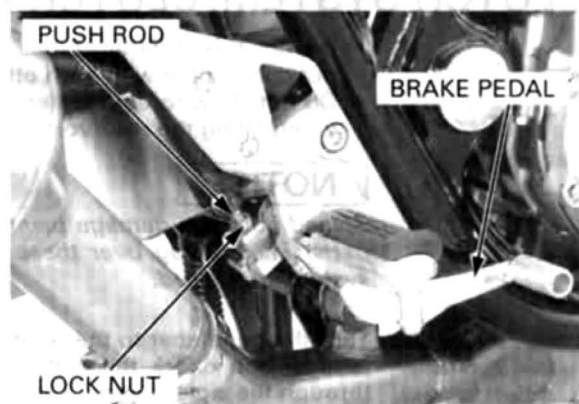
Align the allowance on the brake lever with the index number on the adjuster.

The distance between the top of the brake lever and the grip can be adjusted by turning the adjuster.



BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



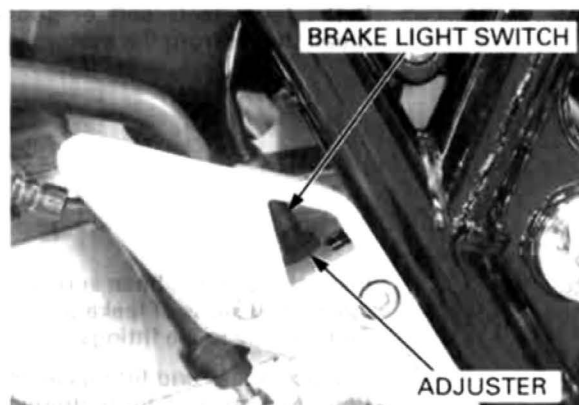
BRAKE LIGHT SWITCH

The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Hold the switch body and turn the adjuster. Do not turn the switch body.

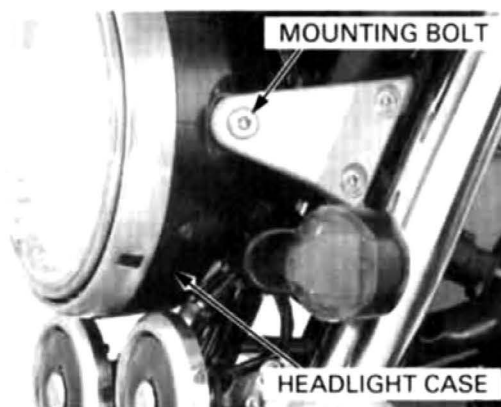


HEADLIGHT AIM

Place the motorcycle on a level surface.

Adjust the headlight beam as specified by local laws and regulations.

Adjust the headlight beam vertically by loosening the headlight case mounting bolts and moving the case.



Adjust the headlight beam horizontally by turning the horizontal beam adjusting screw.
A clockwise rotation moves the beam toward the right side of the rider.



CLUTCH SYSTEM/CLUTCH FLUID

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

NOTICE

Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

When the fluid level is low, check entire system for leaks.

Turn the handlebar to the right so that the reservoir is level and check the clutch fluid reservoir level through the sight glass.

Firmly apply the clutch lever, and check that no air has entered the system.

If the lever feels soft or spongy when operated, bleed the air from the system.

Inspect the clutch hose and fittings for deterioration, cracks and signs of leakage.
Tighten any loose fittings.

Replace hoses and fittings as required.
Refer to page 10-6 for hydraulic clutch bleeding procedures.



SIDE STAND

The center stand is optional equipment for this motorcycle.

Support the motorcycle on a level surface.

Check the side stand spring for damage or loss of tension.

Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 19-26).



SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.

Check the entire assembly for signs of leaks, damage or loose fasteners.

Loose, worn or damaged suspension parts impair motorcycles stability and control.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to the fork service (page 13-18).



FRONT SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

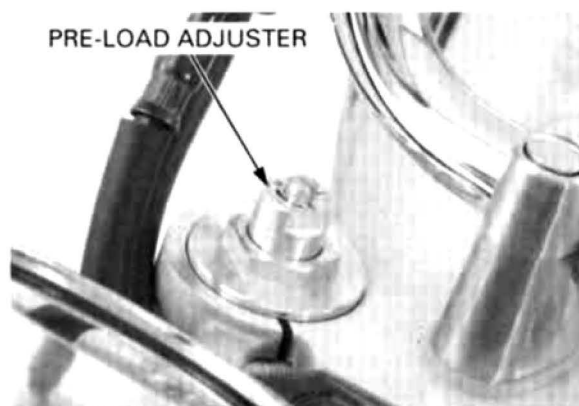
Spring pre-load can be adjusted by turning the adjuster.

TURN CLOCKWISE:

Increase the spring pre-load

TURN COUNTERCLOCKWISE:

Decrease the spring pre-load

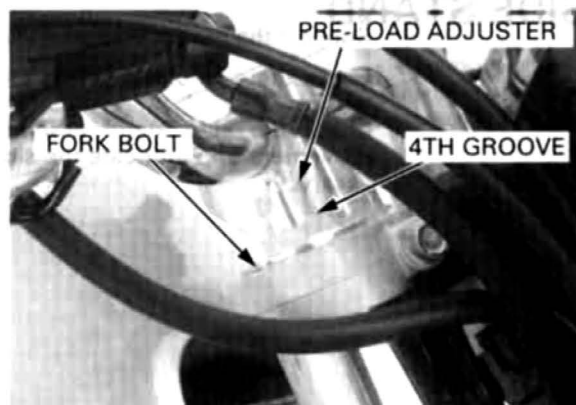


PRE-LOAD ADJUSTER ADJUSTABLE RANGE:

6 – 21 mm (0.2 – 0.8 in) from top of fork bolt

PRE-LOAD ADJUSTER STANDARD POSITION:

14 mm (0.6 in) from top of fork bolt or
4th groove from top



REBOUND DAMPING ADJUSTERS

- Always start on full hard when adjusting the damping.

NOTICE

Do not turn the adjuster screws more than the given positions or the adjusters may be damaged.

The rebound damping can be adjusted by turning the adjusters.

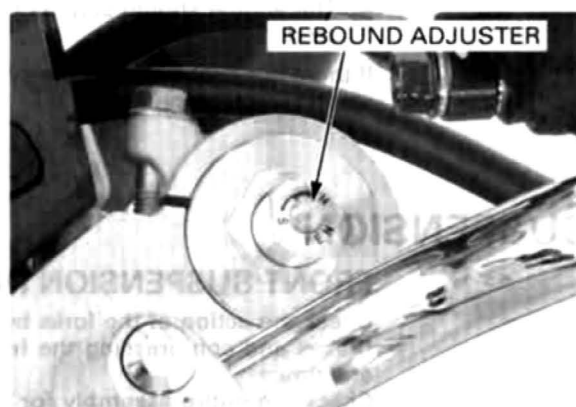
DIRECTION H: Increase the damping force

DIRECTION S: Decrease the damping force

Turn the rebound adjuster clockwise until it stops, then turn the adjuster counterclockwise.

REBOUND ADJUSTER STANDARD POSITION:

1-1/2 turns out from full hard



REAR SUSPENSION INSPECTION

Support the motorcycle securely and raise the rear wheel off the ground.

Hold the swingarm and move the rear wheel sideways with force to see if the wheel bearings are worn.



Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side to side.
Replace the bearings if any looseness is noted.



Check the action of the shock absorber by compressing it several times.
Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.
Refer to the shock absorber service (page 14-13).



REAR SUSPENSION ADJUSTMENT

SPRING PRELOAD ADJUSTER

- Always start on full hard when adjusting the damping.

NOTICE

Do not turn the adjuster screws more than the given positions or the adjusters may be damaged.

To adjust the spring preload, turn the spring adjuster using equipped tool.

COUNTERCLOCKWISE TURN: Decrease preload

CLOCKWISE TURN: Increase preload

PRELOAD ADJUSTER STANDARD POSITION:

2nd position from softest



REBOUND DAMPING ADJUSTERS

The rebound damping can be adjusted by turning the adjusters.

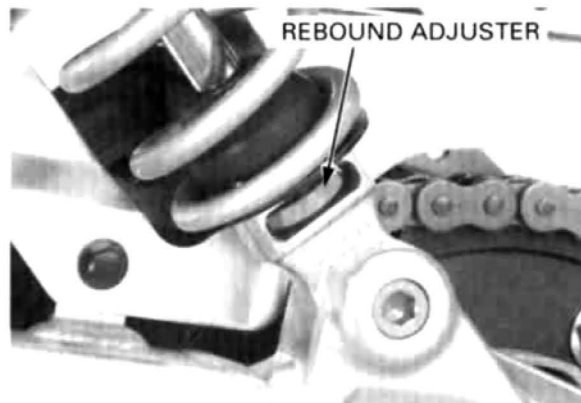
DIRECTION H: Increase the damping force

DIRECTION S: Decrease the damping force

Turn the rebound adjuster clockwise until it stops, then turn the adjuster counterclockwise.

REBOUND ADJUSTER STANDARD POSITION:

10 clocks out from full hard



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).
Check that all safety clips, hose clamps and cable stays are in place and properly secured.



WHEELS/TIRES

Tire pressure should be checked when the tires are COLD.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm ² , psi)		250 (2.50, 36)	290 (2.90, 42)
Tire size		120/70 ZR 17 M/C (58W)	180/55 ZR 17 M/C (73W)
Tire brand	Dunlop	D220FSTK	D2220STK
	Michelin	MACADAM 100XC	MACADAM 100XC

Check the tires for cuts, embedded nails, or other damage.

Check the front wheel (page 13-12) and rear wheel (page 14-6) for trueness.

Measure the tread depth at the center of the tires. Replace the tires when the tread depth reaches the following limits.

MINIMUM TREAD DEPTH:

FRONT: 1.5 mm (0.06 in)

REAR: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

Check that the control cables do not interfere with handlebar rotation.

Support the motorcycle securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-30).

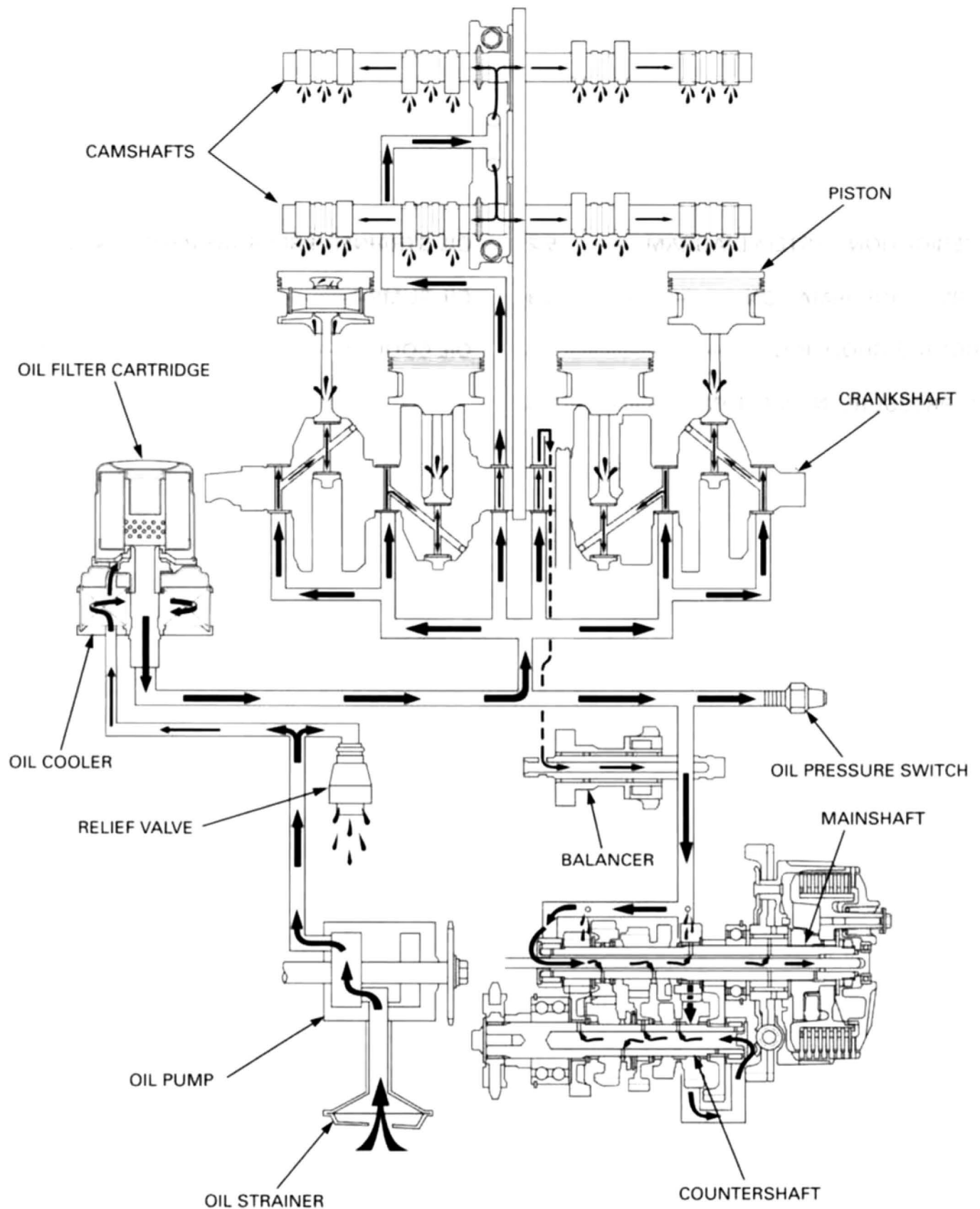


5. LUBRICATION SYSTEM

5

LUBRICATION SYSTEM DIAGRAM	5-2	OIL STRAINER/PRESSURE RELIEF VALVE ..	5-6
SERVICE INFORMATION	5-3	OIL PUMP	5-9
TROUBLE SHOOTING	5-4	OIL COOLER	5-14
OIL PRESSURE INSPECTION	5-5		

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.7 liter (3.9 US qt, 3.3 Imp qt)	—
	After draining/filter change	3.9 liter (4.1 US qt, 3.4 Imp qt)	—
	After disassembly	4.8 liter (5.1 US qt, 4.2 Imp qt)	—
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		490 - 588 kPa (5.0 - 6.0 kgf/cm ² , 71 - 85 psi) at 5,000 min ⁻¹ (rpm)/(80° C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.22 (0.006 - 0.009)	0.35 (0.014)
	Side clearance	0.02 - 0.07 (0.001 - 0.003)	0.10 (0.004)

Unit: mm (in)

TORQUE VALUES

Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Oil pump driven sprocket bolt/washer	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply a locking agent to the threads
Oil cooler bolt (filter boss)	74 N·m (7.5 kgf·m, 54 lbf·ft)	
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal bolt/washer	2 N·m (0.22 kgf·m, 1.6 lbf·ft)	
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the O-ring
Engine oil drain plug	29 N·m (3.0 kgf·m, 22 lbf·ft)	

TOOLS

Oil pressure gauge set 07506-3000001  or equivalent commercially available	Oil pressure gauge attachment 07406-0030000 	Oil filter wrench 07HAA-PJ70101 
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TROUBLE SHOOTING

Oil level too low

- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

Low oil pressure

- Oil level low
- Clogged oil strainer
- Internal oil leak
- Incorrect oil being used

No oil pressure

- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

High oil pressure

- Oil pressure relief valve stuck closed
- Clogged oil filter, gallery or metering orifice
- Incorrect oil being used

Oil contamination

- Oil or filter not changed often enough
- Worn piston rings

Oil emulsification

- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE INSPECTION

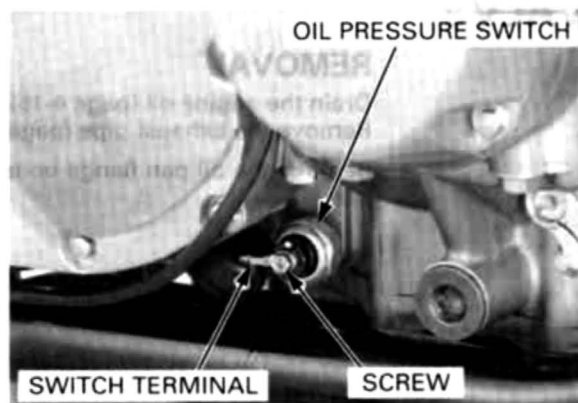
If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

Check the oil level (page 4-14).

Warm up the engine to normal operating temperature (approximately 80° C/176° F).

Stop the engine and remove the oil pressure switch terminal screw.

Remove the oil pressure switch.



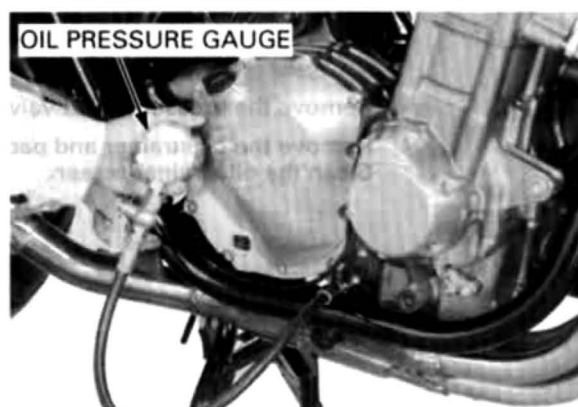
Connect an oil pressure gauge and attachment to the pressure switch hole.

TOOLS:

Oil pressure gauge set 07506-3000001
(Equivalent commercially available)

Oil pressure gauge attachment 07406-0030000

Start the engine and increase the rpm to 5,000 min⁻¹ (rpm) and read the oil pressure.



OIL PRESSURE:

490 - 588 kPa (5.0 - 6.0 kgf/cm², 71 - 85 psi) at 5,000 min⁻¹ (rpm)/(80° C/176° F)

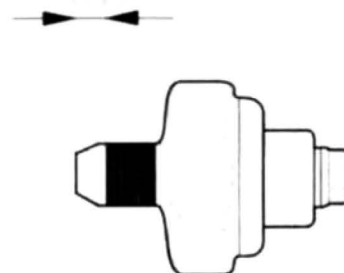
Stop the engine and remove the tools.

Apply sealant to the threads of the oil pressure switch threads.

Install and tighten the oil pressure switch to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Do not apply sealant to the thread head 3 - 4 mm (0.1 - 0.2 in).



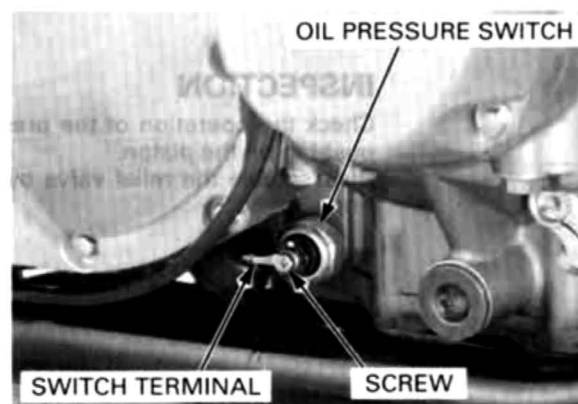
Route the oil pressure switch wire properly (page 1-23).

Connect the switch wire to the terminal and tighten the screw to the specified torque.

TORQUE: 2 N·m (0.22 kgf·m, 1.6 lbf·ft)

Start the engine and check that the oil pressure warning indicator goes off after few seconds.

If the warning indicator incorrect, check the oil pressure switch (page 19-20).



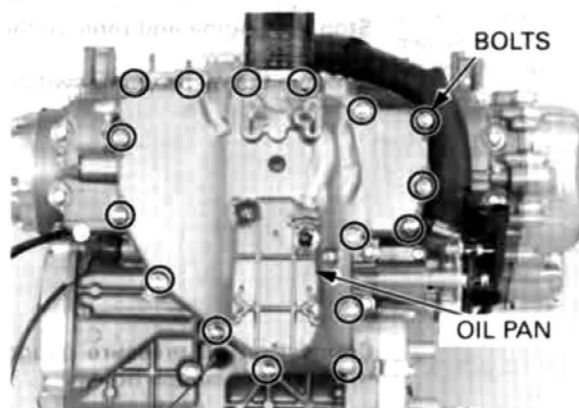
OIL STRAINER/PRESSURE RELIEF VALVE

REMOVAL

Drain the engine oil (page 4-15).

Remove the exhaust pipe (page 3-12).

Remove the oil pan flange bolts, wire clamp and oil pan.



Remove the pressure relief valve and O-ring.

Remove the oil strainer and packing.
Clean the oil strainer screen.

RELIEF VALVE

OIL STRAINER

Remove the bolts, oil pass pipe and O-rings.
Remove the bolts, oil pipe and O-rings.

BOLTS

OIL PASS PIPE

OIL PIPE

INSPECTION

Check the operation of the pressure relief valve by pushing on the piston.

Disassemble the relief valve by removing the snap ring.

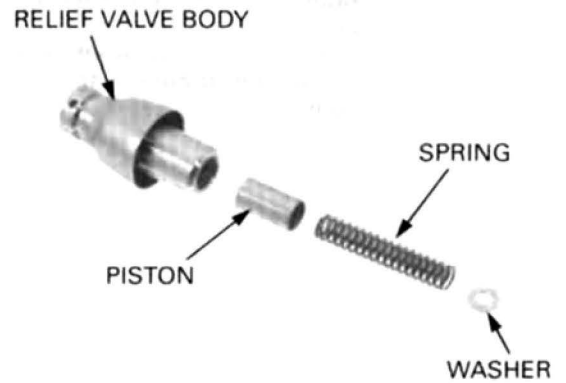
SNAP RING

RELIEF VALVE



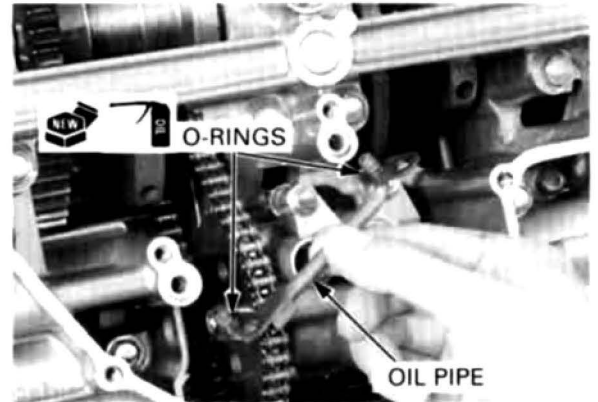
Inspect the piston for wear, sticking or damage.
Inspect the spring for weakness or damage.

Assemble the relief valve in the reverse order of disassembly.

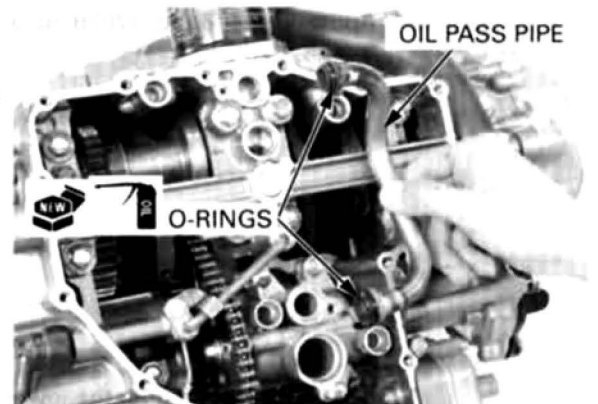


INSTALLATION

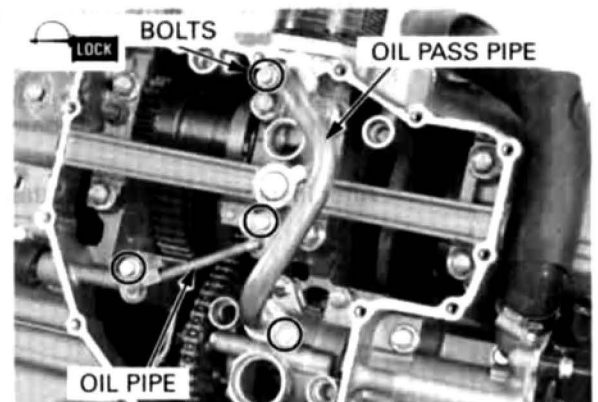
Apply oil to the new O-rings and install it onto the oil pipe.
Install the oil pipe into the crankcase.
Apply a locking agent to the oil pipe bolt threads and install them.



Apply oil to the new O-rings and install it onto the oil pipe.
Install the oil pipe into the crankcase.
Apply a locking agent to the oil pipe bolt threads and install them.



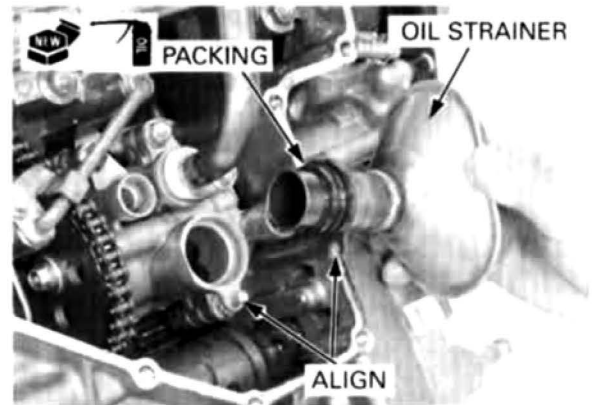
Tighten the oil pipe bolts and oil pass pipe bolts securely.



LUBRICATION SYSTEM

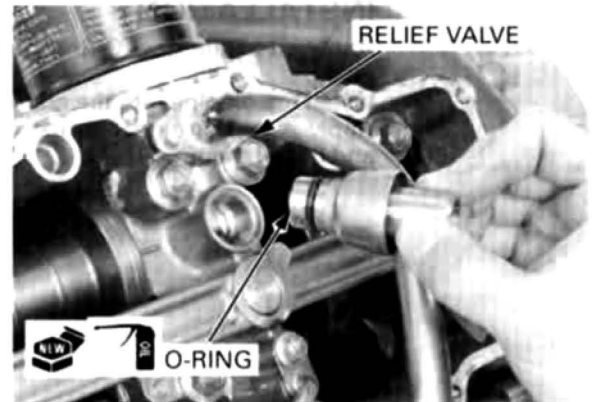
Apply oil to the new packing and install it onto the oil strainer.

Install the oil strainer into the oil pump while aligning strainer groove with the boss on the oil pump body.



Apply oil to the new O-ring and install it onto the relief valve.

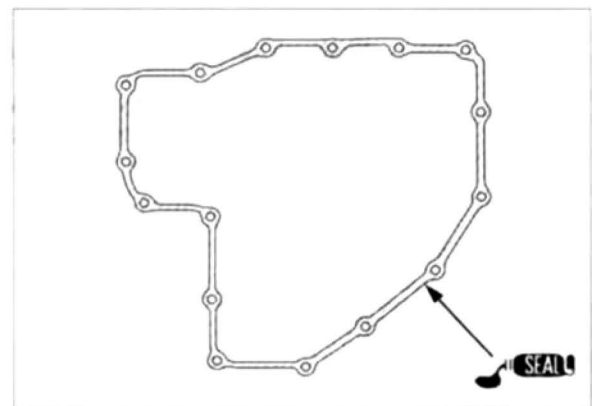
Install the relief valve into the crankcase.



Clean the oil pan mating surface thoroughly.

Do not apply sealant more than necessary.

Apply Three Bond 1207B or an equivalent to the mating surface.



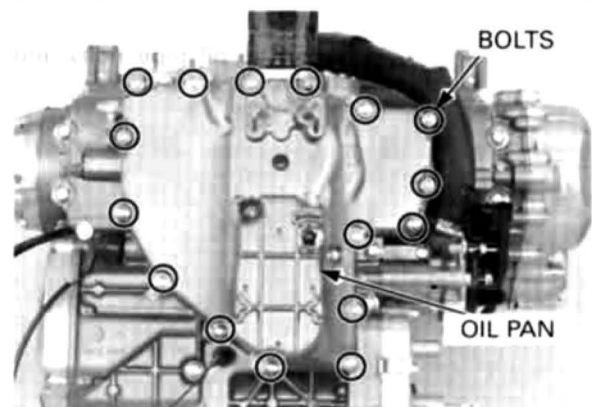
Install the oil pan onto the lower crankcase.

Install the wire clamp and oil pan mounting bolts. Tighten the all bolts in a crisscross pattern in 2 – 3 steps.

Install the exhaust pipe (page 3-14).

Fill the crankcase with recommended oil (page 4-15).

After installation, check that there are no oil leaks.



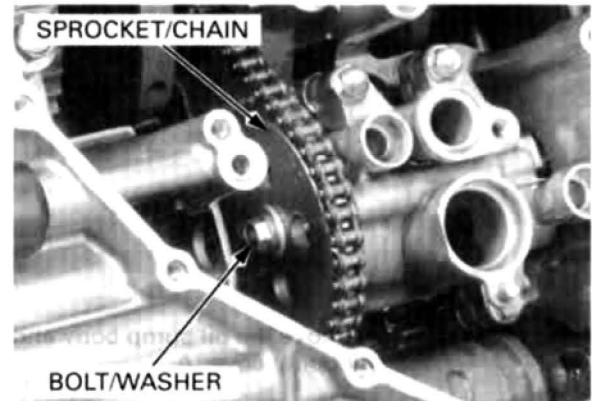
OIL PUMP

REMOVAL

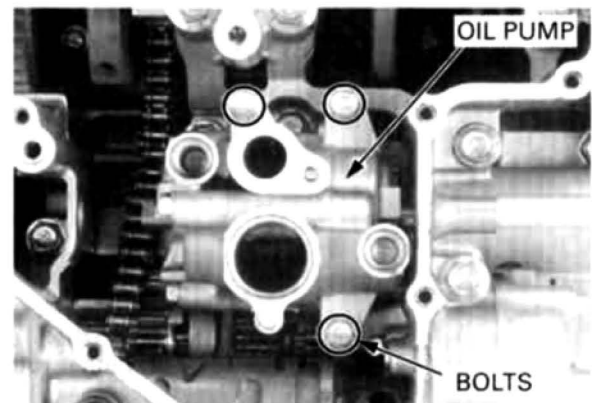
Remove the following:

- Clutch (page 10-16)
- Water pump (page 7-15)
- Oil pan (page 5-6)

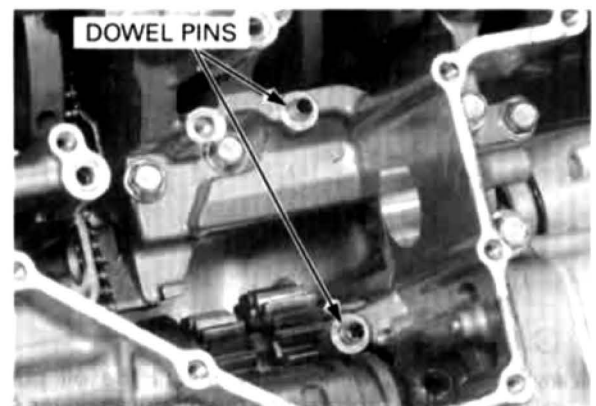
Remove the bolt/washer, then remove the oil pump driven sprocket and drive chain from the oil pump shaft.



Remove the three flange bolts and oil pump assembly.

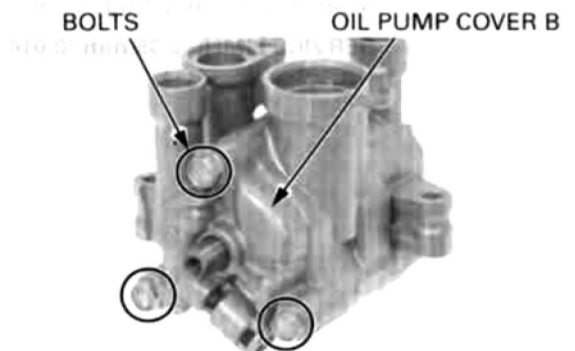


Remove the dowel pins.



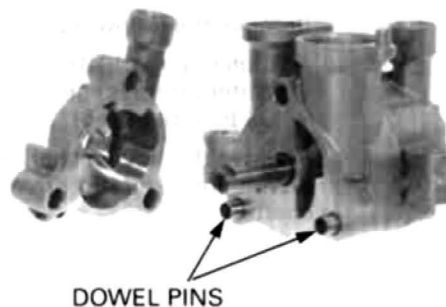
DISASSEMBLY

Remove the bolts and oil pump cover B.

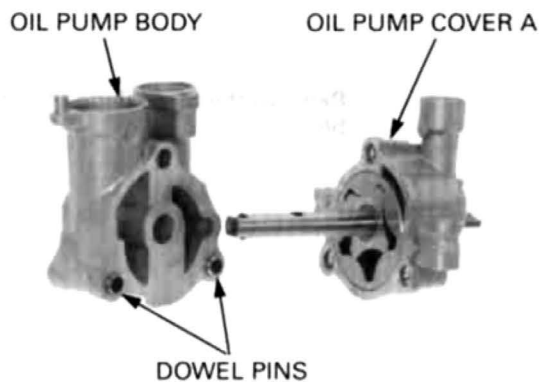


LUBRICATION SYSTEM

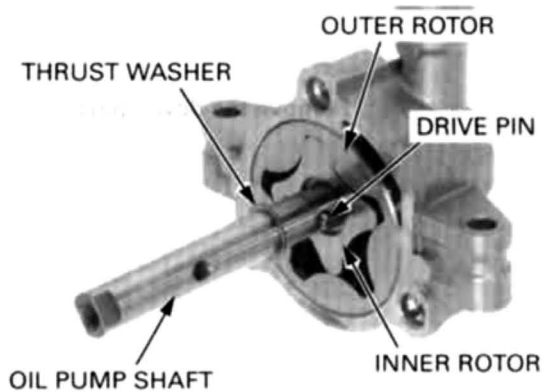
Remove the dowel pins.



Remove the oil pump body and dowel pins front the oil pump cover A.



Remove the thrust washer, drive pin, oil pump shaft, outer rotor and inner rotor from the oil pump cover A.



INSPECTION

If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.

Temporarily install the oil pump inner and outer rotors into the oil pump cover A. Install the oil pump shaft.

Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

BODY CLEARANCE:



Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

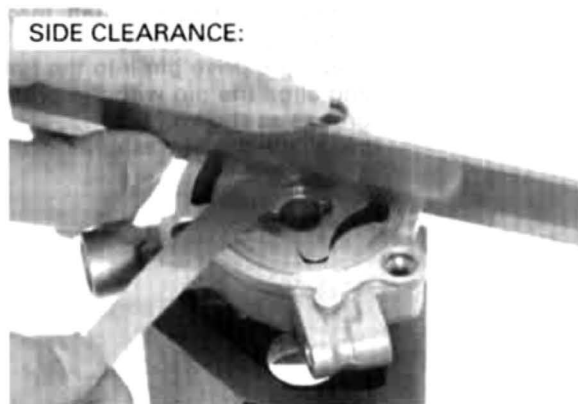
TIP CLEARANCE:



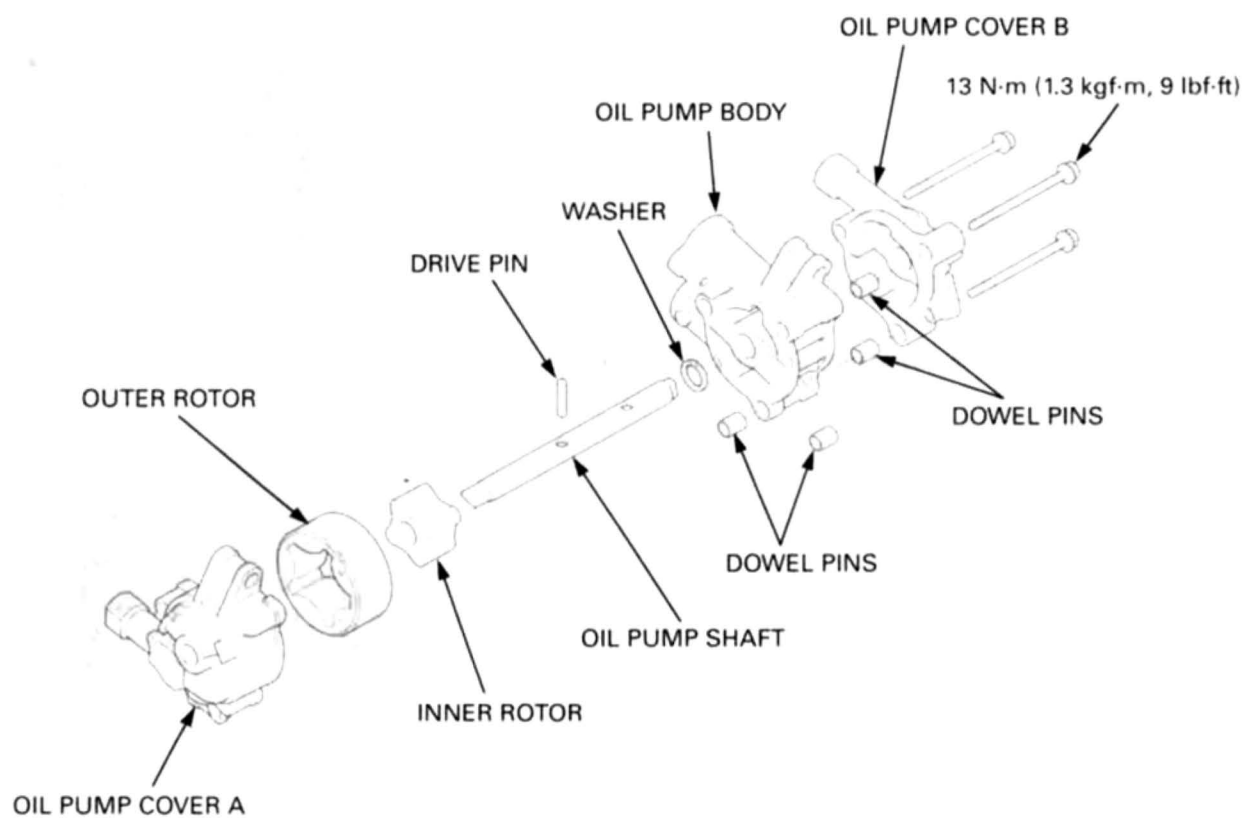
Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

SIDE CLEARANCE:

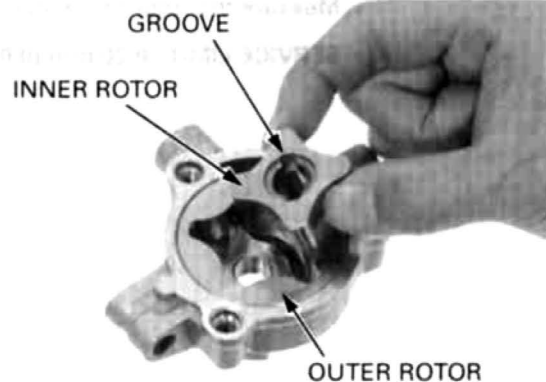


ASSEMBLY

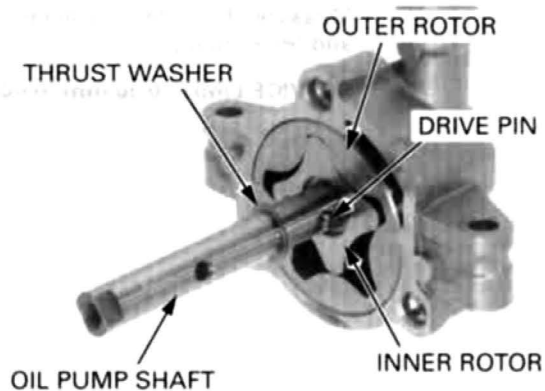


LUBRICATION SYSTEM

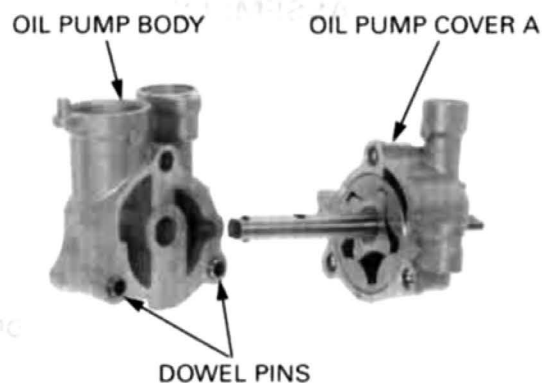
Apply clean engine oil to each parts.
Install the outer rotor into the oil pump cover A.
Install the inner rotor into the outer rotor with its drive pin groove facing the oil pump body.



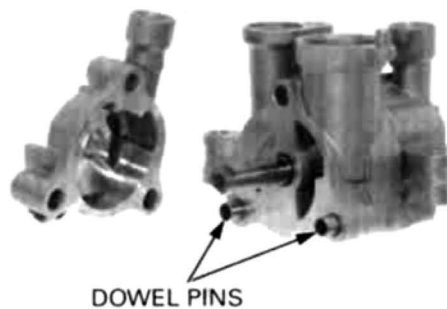
Install the oil pump shaft through the inner rotor and oil pump cover A.
Install the drive pin into the hole in the pump shaft and align the pin with the groove in the inner rotor groove as shown.
Install the thrust washer.



Install the dowel pins to the oil pump body.
Install the oil pump body to the oil pump cover A.



Install the dowel pins and oil pump cover B.

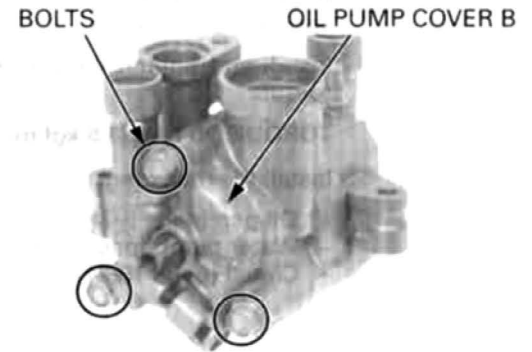


Install the oil pump assembly bolts and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

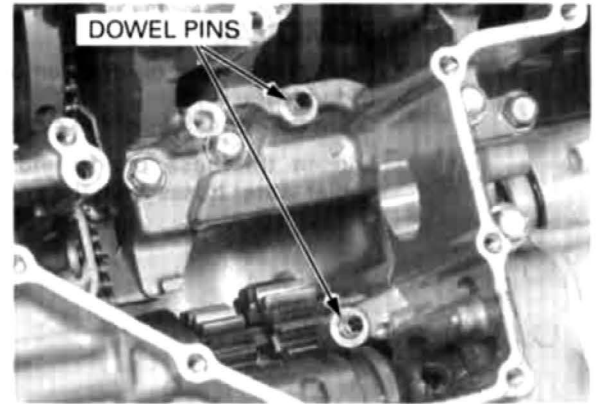
Check the oil pump operation by turning the pump shaft.

If necessary, reassemble the oil pump.

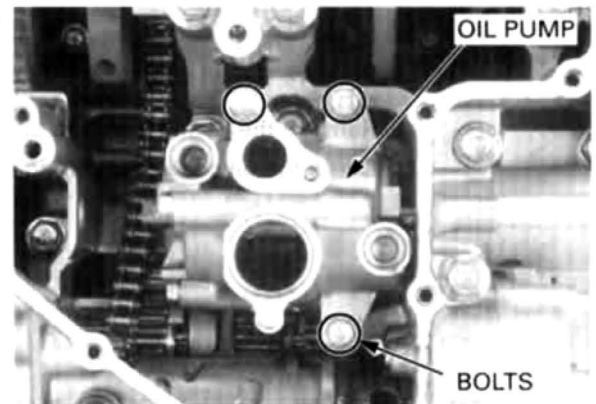


INSTALLATION

Install the dowel pins to the crankcase.

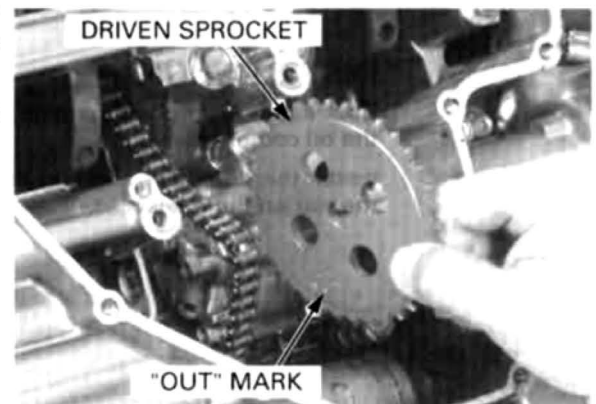


Install the oil pump and tighten the mounting bolts securely.



Install the oil pump driven sprocket with its "OUT" mark facing the clutch and install it into the drive chain.

Install the driven sprocket onto the oil pump shaft while aligning the cut-outs.



LUBRICATION SYSTEM

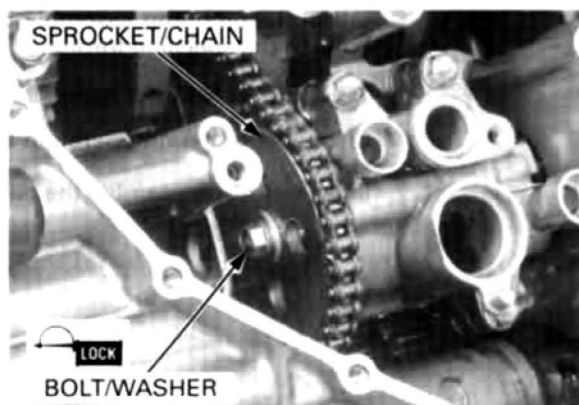
Apply a locking agent to the oil pump driven sprocket bolt threads.

Install and tighten the bolt/washer to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the following:

- Oil pan (page 5-7)
- Water pump (page 7-16)
- Clutch (page 10-21)



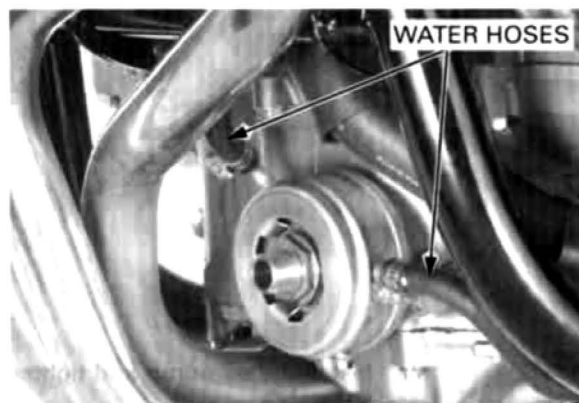
OIL COOLER

REMOVAL

Drain the engine oil and remove the oil filter cartridge (page 4-15)

Drain the coolant from the system (page 7-6).

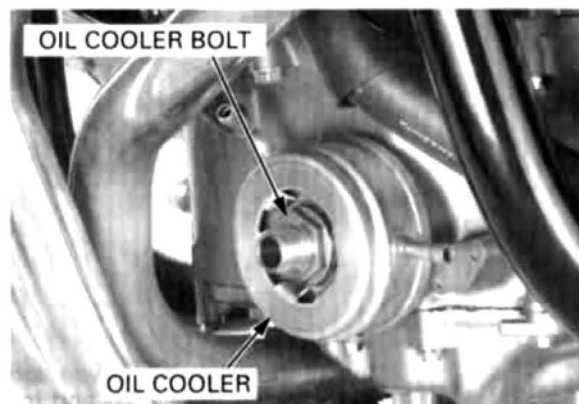
Loosen the hose bands and disconnect the oil cooler water hoses from the cooler.



Remove the oil cooler bolt (filter boss), washer and oil cooler.

Remove the O-ring from the oil cooler.

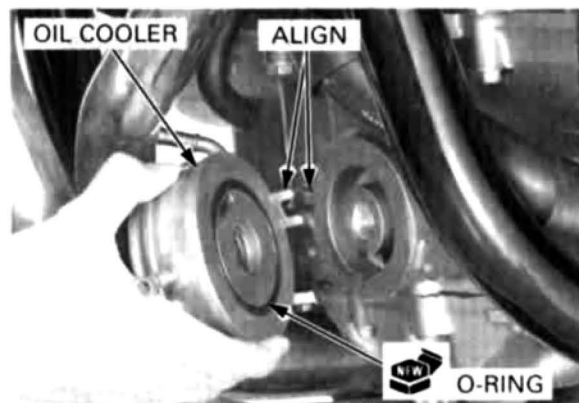
Check the oil cooler for damage.



INSTALLATION

Coat a new O-ring with engine oil and install it into the oil cooler groove.

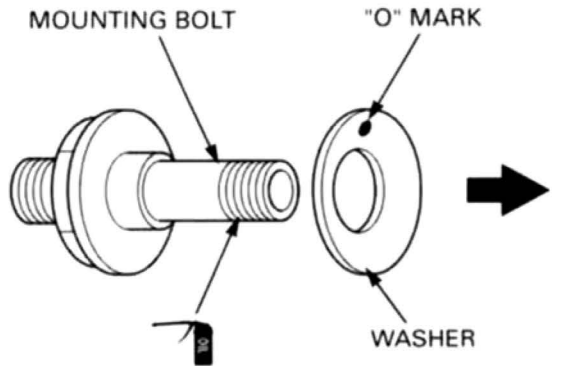
Install the oil cooler aligning its guide groove with the rug on the crankcase.



Apply oil to the oil cooler bolt threads and seating surface.

Install the lock washer with its concave side ("o" mark) facing the oil cooler.

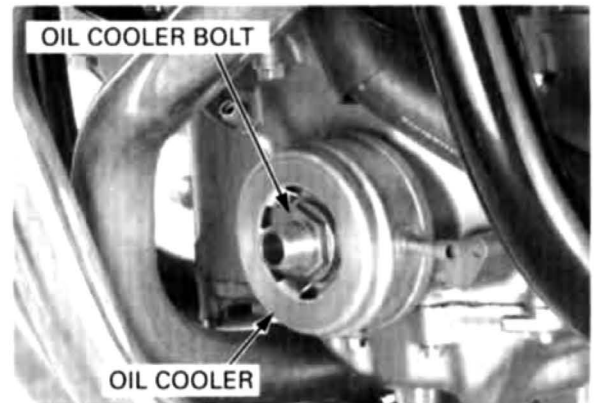
Install the lock washer and oil cooler bolt.



Be sure the cooler bolt collar slides inside the oil cooler.

Tighten the oil cooler bolt to the specified torque.

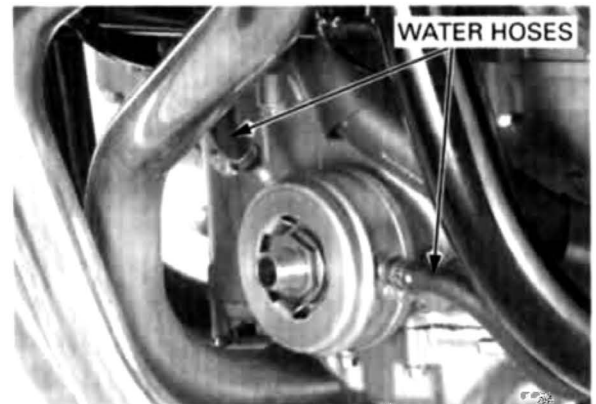
TORQUE: 74 N·m (7.5 kgf·m, 51 lbf·ft)



Connect the oil cooler water hoses, tighten the hose band securely.

Install the oil filter cartridge and fill the crankcase with recommended oil (page 4-14).

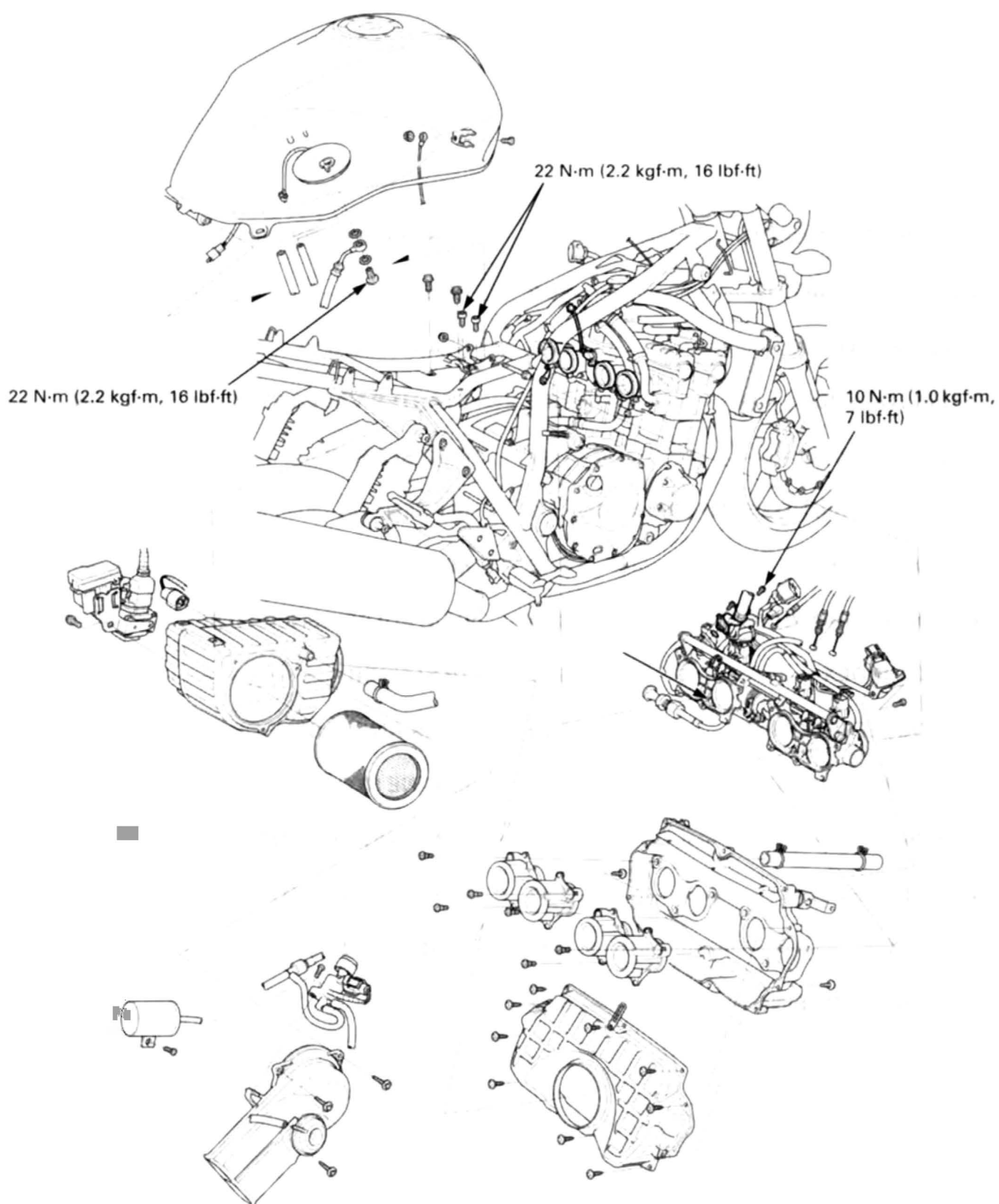
Fill the cooling system and bleed air (page 7-6).



6. FUEL SYSTEM (Programmed Fuel Injection)

COMPONENT LOCATION	6-2	THROTTLE BODY	6-57
SERVICE INFORMATION	6-3	INJECTOR	6-67
TROUBLESHOOTING	6-5	STARTER VALVE.....	6-69
SYSTEM LOCATION.....	6-6	STARTER VALVE SYNCHRONIZATION	6-73
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DTC CODE INDEX.....	6-27	TP SENSOR.....	6-79
DTC TROUBLESHOOTING.....	6-30	BANK ANGLE SENSOR	6-81
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FUEL PUMP.....	6-45	ECM (ENGINE CONTROL MODULE).....	6-83
FUEL CUT-OFF RELAY	6-47	VARIABLE AIR INTAKE CONTROL VALVE.....	6-84
FUEL TANK	6-48	PAIR SOLENOID VALVE	6-86
AIR CLEANER HOUSING	6-52		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel hose, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Always replace the sealing rubber when the fuel pump is removed.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described (page 6-8). If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (page 6-12).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in two injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine from the standpoint of protecting it.
- Refer to PGM-FI system location (page 6-6).
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Refer to procedures for fuel level sensor inspection (page 19-22).
- The vehicle speed sensor sends digital pulse signal to the ECM (PGM-FI unit) and computation. Refer to procedures for vehicle speed sensor inspection (page 19-15).
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.
- When replacing the ECM, always follow the step in the IMMOBILIZER SYSTEM (page 20-6).

SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ36A
Starter valve vacuum difference	20 mm Hg
Base throttle valve for synchronization	No.1
Idle speed	$1,000 \pm 100 \text{ min}^{-1}$ (rpm)
Throttle grip free play	2 – 4 mm (1/16 – 3/16 in)
Intake air temperature sensor resistance (at 20°C/68°F)	1 – 4 k Ω
Engine coolant temperature sensor resistance (at 20°C/68°F)	2.3 – 2.6 k Ω
Fuel injection resistance (at 20°C/68°F)	10.5 – 14.5 Ω
PAIR solenoid valve resistance (at 20°C/68°F)	20 – 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Manifold absolute pressure at idle	150 – 250 mm Hg
Fuel pressure at idle	343 kPa (3.5 kgf/cm ² , 50 psi)
Fuel pump flow (at 12V)	188 cm ³ (6.4 US oz, 6.6 Imp oz) minimum/10 seconds

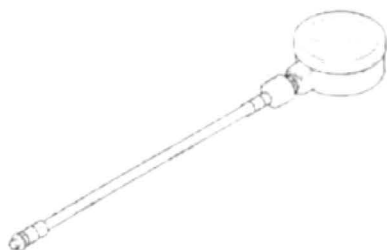
FUEL SYSTEM (Programmed Fuel Injection)

TORQUE VALUES

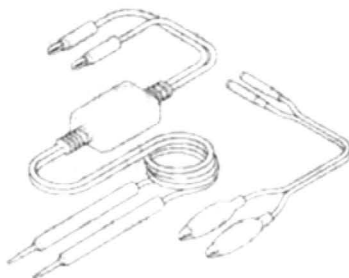
ECT (Coolant temperature sensor)/ thermo sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	See page 1-17
Throttle body insulator band screw	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Fuel rail mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Service check bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Starter valve lock nut	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	
Starter valve synchronization plate screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)	
Choke link plate screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)	
Choke cable/throttle stop screw bracket mounting screw	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Fuel hose banjo bolt (fuel pump side)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fuel hose mounting bolt (throttle body side)	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fuel pump mounting nut	See page 1-17	
Fuel tank rear bracket mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	

TOOLS

Fuel pressure gauge
07406-0040003

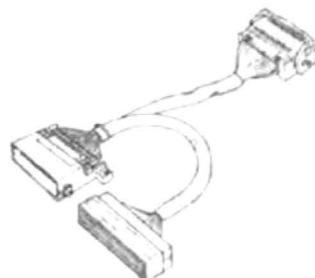


Peak voltage adaptor
07HGJ-0020100



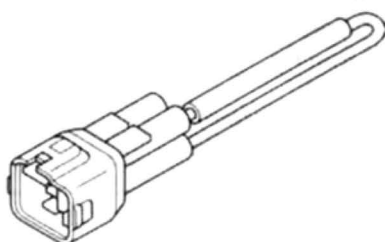
with commercially available digital
multimeter (impedance 10 M Ω DCV
minimum)

ECU test harness 32P
070MZ-0010201



Two required

SCS short connector
070PZ-ZY30100



TROUBLESHOOTING

Engine won't to start

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

Engine stall, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- Starter valve synchronization misadjusted

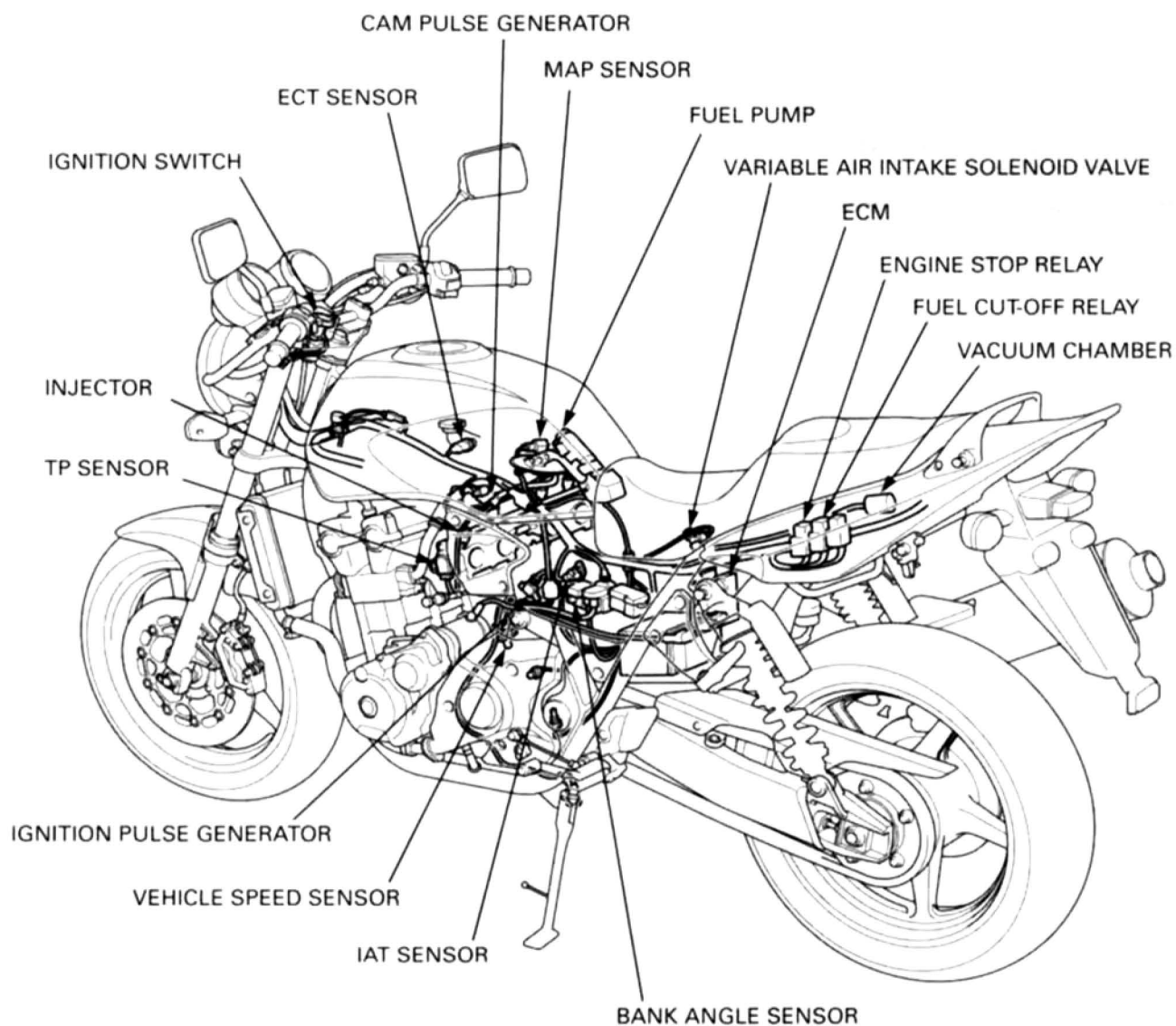
Backfiring or misfiring during acceleration

- Ignition system malfunction

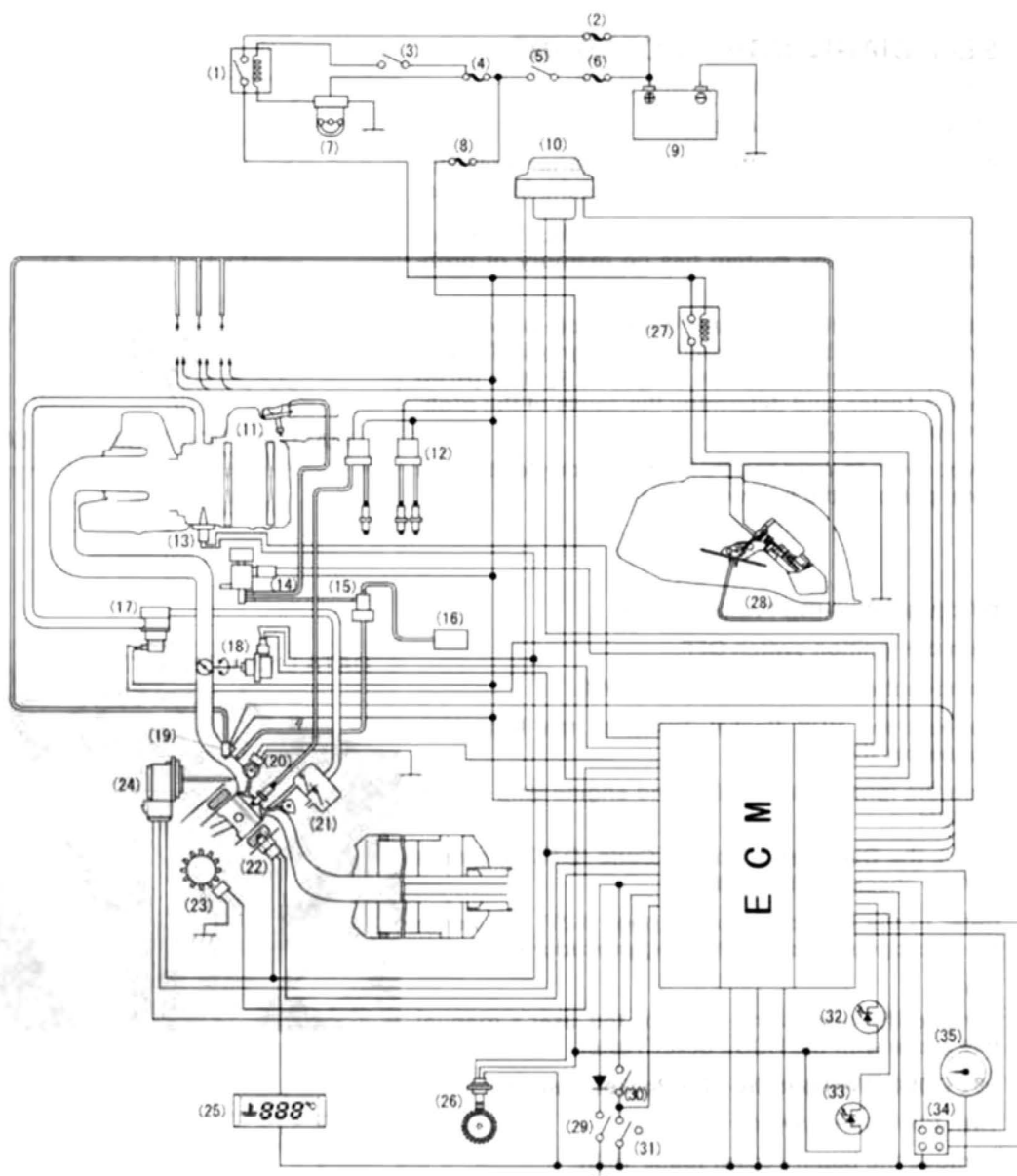
Poor performance (driveability) and poor fuel economy

- Pinched or clogged fuel hose
- Faulty pressure regulator

SYSTEM LOCATION



FULL NAME	ABBREVIATIONS
Manifold absolute pressure sensor	MAP sensor
Throttle position sensor	TP sensor
Intake air temperature sensor	IAT sensor
Engine coolant temperature sensor	ECT sensor
Engine control module	ECM



(1)	Engine stop relay	(19)	Injector
(2)	Sub-fuse (20A)	(20)	Cam pulse generator
(3)	Engine stop switch	(21)	PAIR check valve
(4)	Sub-fuse (10A)	(22)	ECT sensor
(5)	Ignition switch	(23)	Ignition pulse generator
(6)	Main fuse A (30A)	(24)	MAP sensor
(7)	Bank angle sensor	(25)	Coolant temperature indicator
(8)	Sub-fuse (10A)	(26)	Vehicle speed sensor
(9)	Battery	(27)	Fuel cut-off relay
(10)	Immobilizer receiver	(28)	Fuel pump
(11)	Variable intake port diaphragm	(29)	Neutral switch
(12)	Ignition coil	(30)	Clutch switch
(13)	IAT sensor	(31)	Side stand switch
(14)	Bypass control solenoid valve	(32)	Malfunction indicator lamp (MIL)
(15)	One-way valve	(33)	Immobilizer indicator
(16)	Vacuum chamber	(34)	Service check connector
(17)	PAIR solenoid valve	(35)	Tachometer
(18)	TP sensor		

PGM-FI SELF-DIAGNOSIS INFORMATION

SELF-DIAGNOSTIC PROCEDURE

Place the motorcycle on its side stand.

Start the engine and let it idle.

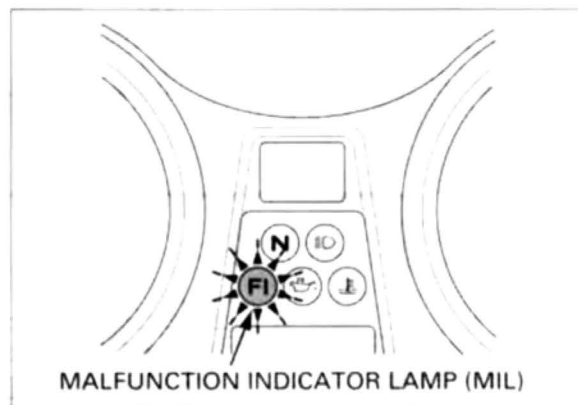
If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blink.

If the malfunction indicator lamp (MIL) does not light or blink, the system has no memory of problem data.

If the malfunction indicator blinks, note how many times the MIL blinks or read the Diagnosis Trouble Code (DTC) with the Honda Diagnosis System (HDS) Pocket Tester, and determine the cause of the problem (page 6-12/page 6-27).

If you wish to read the PGM-FI memory for trouble data, perform the following:

The MIL will start blink only with the side stand down and with the engine off (engine stop switch is RUN) or engine revs are below 5,000 min⁻¹ (rpm). In any conditions, the MIL will illuminate and stay on.



DTC (With the HDS Pocket Tester)

Turn the ignition switch OFF.

Remove the battery cover (page 6-43).

Connect the HDS Pocket Tester to the Data Link Connector (DLC).

Turn the ignition switch ON and engine stop switch to RUN.

Check the Diagnostic Trouble Code (DTC) and note it. Also check the freeze data.

Refer to the DTC code index (page 6-27) and begin the appropriate troubleshooting procedure.

NOTE

For specific operations, refer to the user's manual that came with the HDS Pocket Tester.

MIL CODE (Without the HDS Pocket Tester)

Turn the ignition switch OFF.

Remove the battery cover (page 16-5).

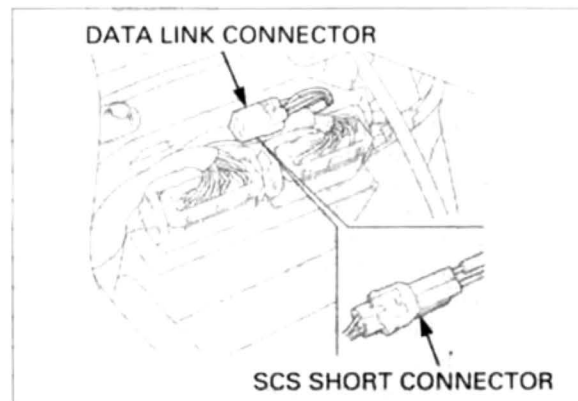
Short the Data Link Connector (DLC) terminals using a special tool.

CONNECTION: Brown - Green

TOOL:

SCS short connector 070PZ-ZY30100

Turn the ignition switch ON and engine stop switch to RUN.

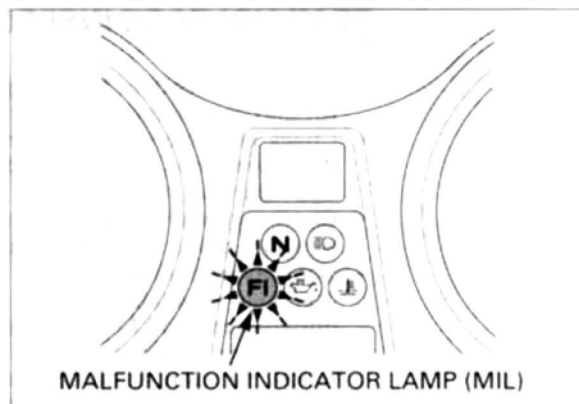


Even if the PGM-FI has memory data, the MIL does not blink when the engine running.

If the ECM has no self diagnosis memory data, the MIL will illuminate, when you turn the ignition switch ON.

If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch ON.

Note how many times the MIL blinks, and determine the cause of the problem (page 6-12).



SELF-DIAGNOSIS RESET PROCEDURE

Reset the self-diagnosis memory data in either of 2 ways;

With the HDS Pocket Tester

Use the HDS Pocket Tester to clear the ECU memory. See the HDS Pocket Tester user's manual for specific instruction.

Without the HDS Pocket Tester

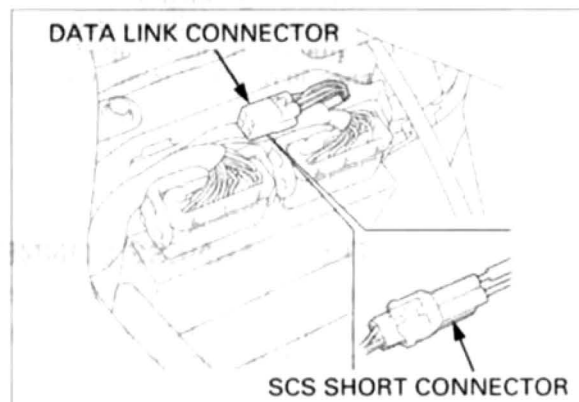
1. Turn the engine stop switch RUN and ignition switch OFF.
2. Short the Data Link Connector (DLC) terminals using a special tool.

CONNECTION: Brown – Green

TOOL:

SCS short connector 070PZ-ZY30100

3. Turn the ignition switch ON.
4. Remove the special tool from the Data Link Connector (DLC).

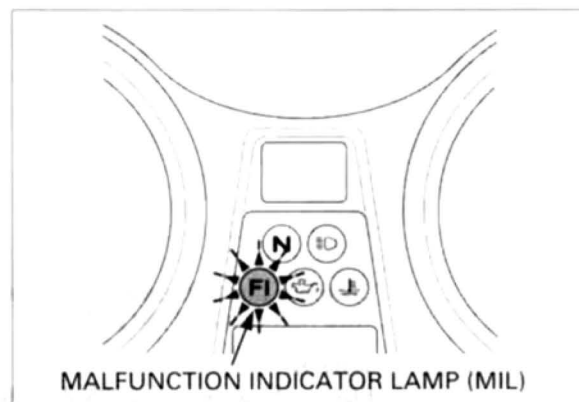


5. The MIL lights about 5 seconds.

While the indicator lights, short the Data Link Connector (DLC) again with the special tool.

Self-diagnosis memory data is erased, if the MIL turn off and start blinking (0.3 second cycle).

- The data link connector must be jumped while the indicator lights. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.
- If the MIL blinks 33 times, the data has not been erased, so try again.
- And yet, if the MIL still blinks 33 times, check the E²-PROM (page 6-26).



PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the ignition pulse generator and cam pulse generator inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the all spark plugs are installed correctly.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

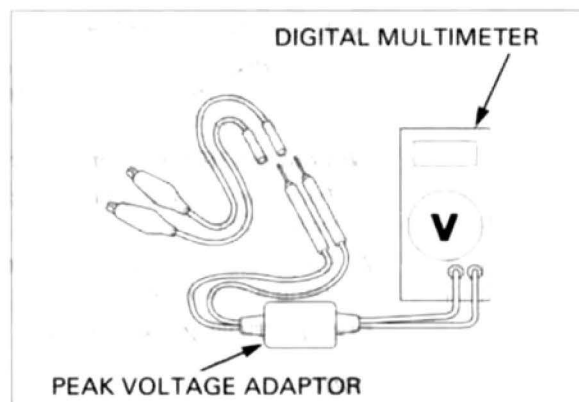
Avoid touching the tester probes to prevent electric shock.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

Imrie diagnostic tester (model 625) or

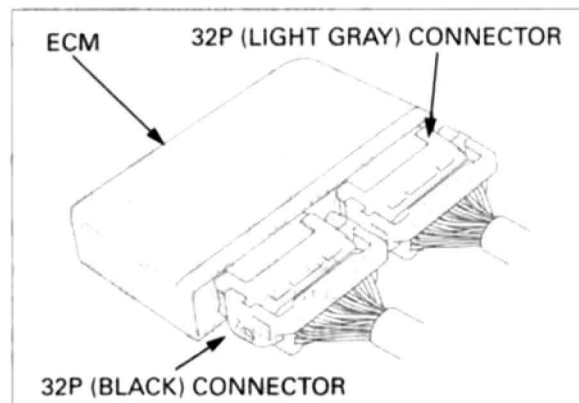
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)



TEST HARNESS CONNECTION

Remove the battery cover (page 6-43).

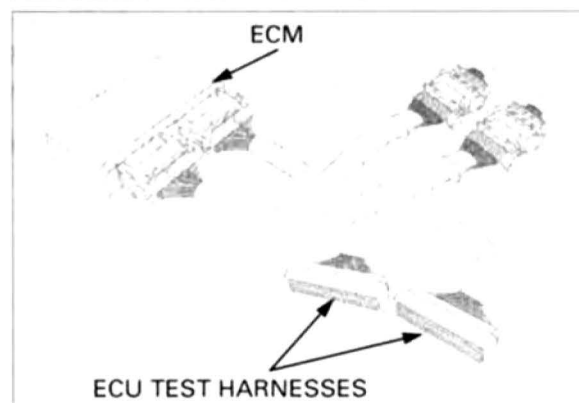
Disconnect the ECM 32P (Black) and 32P (Light gray) connectors from the unit.



Connect the ECU test harnesses between the main wire harness and the ECM.

TOOLS:

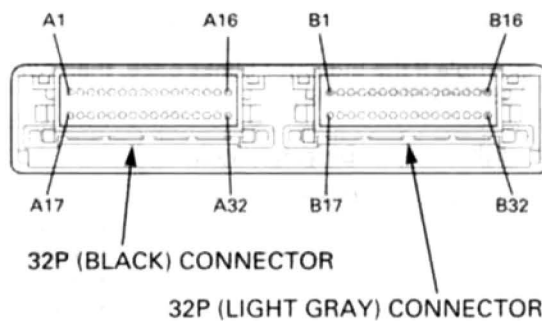
ECU test harness 070MZ-0010201
(two required)



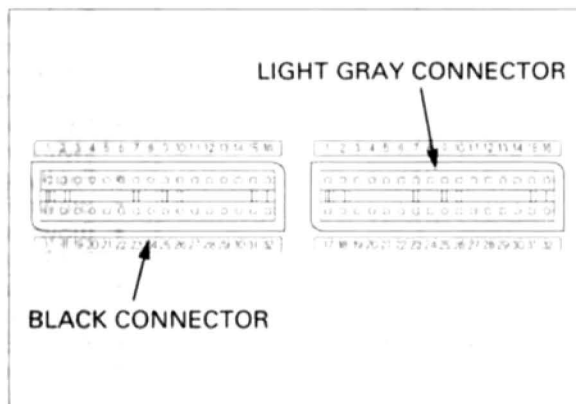
TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown in the illustration.

VIEW FROM WIRE HARNESS SIDE:



The ECU test harness terminals are same layout as for the ECM connector terminals as shown.



MIL CODE INDEX

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.2 seconds it is equivalent to ten blinks. For example, a 1.2 second illumination and two blinks (0.4 second x 2) of the indicator equals 12 blinks. Follow code 12 troubleshooting.
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 (page 6-14) and 2 (page 6-15) troubleshooting.

MIL	Detection Item	Causes	Symptoms	Refer to
No blinks	ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine does not start 	6-83
No blinks	ECM power/ground circuit malfunction	<ul style="list-style-type: none"> Open circuit at the power input wire of the ECM Faulty bank angle sensor Open circuit in bank angle sensor related circuit Faulty engine stop relay Open circuit in engine stop relay related wires Faulty engine stop switch Open circuit in engine stop switch related wires Faulty ignition switch Blown PGM-FI fuse (20 A) Blown sub-fuse (10A) (starter, bank angle sensor) 	<ul style="list-style-type: none"> Engine does not start 	6-83
No blinks	ECM output line malfunction	<ul style="list-style-type: none"> ECM output voltage line (Yellow/Red wire) short circuit 	<ul style="list-style-type: none"> Engine does not start 	—
No blinks	MIL circuit malfunction	<ul style="list-style-type: none"> Faulty ECM Open or short circuit in MIL wire 	<ul style="list-style-type: none"> Engine operates normally 	6-8
Stay lit	Data link circuit malfunction	<ul style="list-style-type: none"> Short circuit in data link connector Faulty ECM Short circuit in data link connector wire 	<ul style="list-style-type: none"> Engine operates normally 	—
1 Blink	MAP sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on MAP sensor connector Open or short circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	6-14
2 Blinks	MAP sensor performance problem	<ul style="list-style-type: none"> Loose or poor connection of the MAP sensor vacuum tube Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	6-15
7 Blinks	ECT sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on ECT sensor Open or short circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F) 	6-16
8 Blinks	TP sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on TP sensor connector Open or short circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine response and performance when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	6-18
9 Blinks	IAT sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on IAT sensor Open or short circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F) 	6-20
11 Blinks	Vehicle speed sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on vehicle speed sensor connector Open or short circuit in vehicle speed sensor connector Faulty vehicle speed sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 5 km/h) 	6-21

FUEL SYSTEM (Programmed Fuel Injection)

MIL	Detection Item	Causes	Symptoms	Refer to
12 Blinks	No.1 injector circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.1 injector connector Open or short circuit in No.1 injector wire Faulty No.1 injector 	<ul style="list-style-type: none"> Engine does not start 	6-22
13 Blinks	No.2 injector circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.2 injector connector Open or short circuit in No.2 injector wire Faulty No.2 injector 	<ul style="list-style-type: none"> Engine does not start 	6-24
14 Blinks	No.3 injector circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.3 injector connector Open or short circuit in No.3 injector wire Faulty No.3 injector 	<ul style="list-style-type: none"> Engine does not start 	6-24
15 Blinks	No.4 injector circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.4 injector connector Open or short circuit in No.4 injector wire Faulty No.4 injector 	<ul style="list-style-type: none"> Engine does not start 	6-24
18 Blinks	Cam pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on cam pulse generator Open or short circuit in cam pulse generator Faulty cam pulse generator 	<ul style="list-style-type: none"> Engine does not start 	6-24
19 Blinks	Ignition pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on ignition pulse generator Open or short circuit in ignition pulse generator Faulty ignition pulse generator 	<ul style="list-style-type: none"> Engine does not start 	6-25
33 Blinks	E ² -PROM in ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine operates normally Does not hold the self-diagnosis data 	6-26

MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the MIL blinking.

1. MAP Sensor Output Voltage Inspection

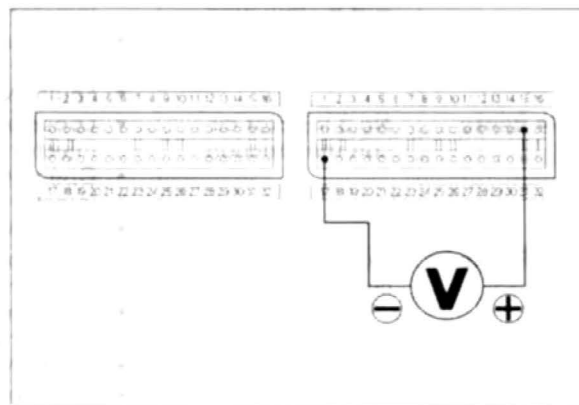
Turn the ignition switch OFF.
Connect the test harness to ECM connectors (page 6-10).

Turn the ignition switch ON and engine stop switch RUN.
Measure the voltage at the test harness terminals.

Connection: B15 (+) – B17 (–)

Is the voltage within 2.7 – 3.1V?

- YES** –
- Intermittent failure
 - Loose or poor contact on the ECM connectors
- NO** –
- About 5 V GO TO STEP 2.
 - About 0 V GO TO STEP 3.



2. MAP Sensor Output Line Inspection

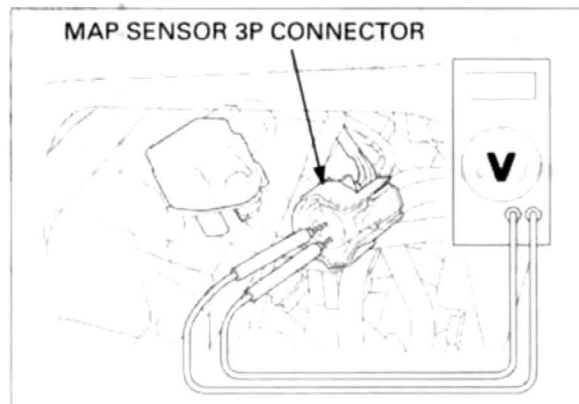
Turn the ignition switch OFF.
Disconnect the MAP sensor 3P connector.

Turn the ignition switch ON and engine stop switch RUN.
Measure the voltage at the wire harness side.

Connection: Light green/Yellow (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25V?

- YES** –
- Faulty MAP sensor
- NO** –
- Open circuit in Light green/Yellow wire
 - Open circuit in Green/Orange wire



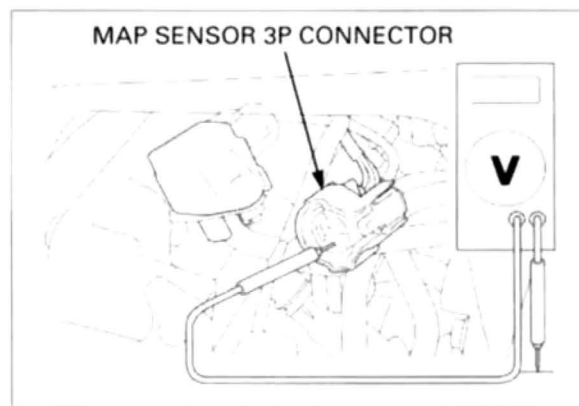
3. MAP Sensor Input Voltage Inspection

Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Ground(–)

Is the voltage within 4.75 – 5.25V?

- YES** – GO TO STEP 4.
- NO** – GO TO STEP 5.



4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

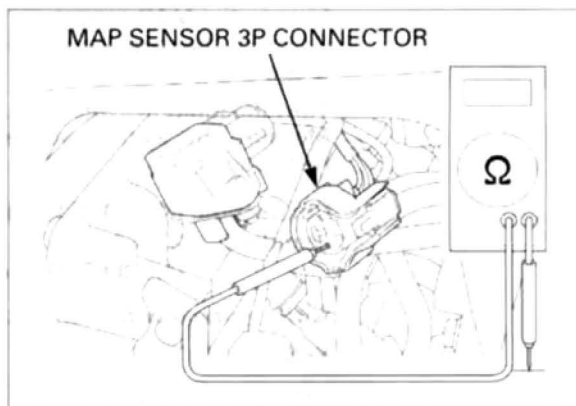
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

Connection: Light green/Yellow – Ground

Is there continuity?

YES – Short circuit in Light green/Yellow wire

NO – Faulty MAP sensor



5. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.

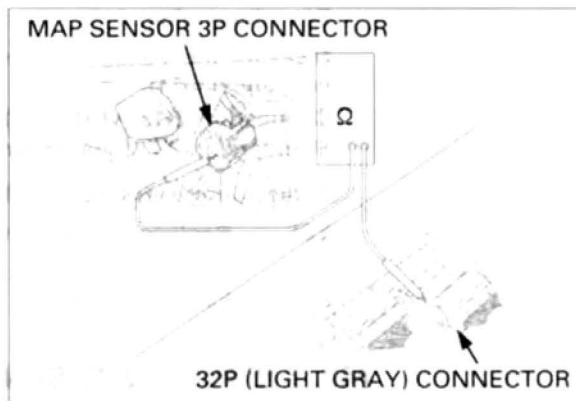
Disconnect the ECM connectors.

Check for continuity at the Yellow/Red wire between the MAP sensor 3P connector terminal and the ECM connectors.

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – Open circuit in Yellow/Red wire



MIL 2 BLINKS (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the MIL blinking.

1. MAP Sensor Hose Inspection

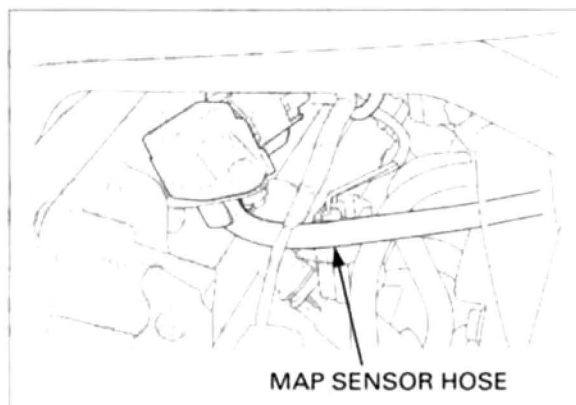
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor hoses.

Is the MAP sensor hoses connection correct?

YES – GO TO STEP 2.

NO – Correct the hose connection or installation



FUEL SYSTEM (Programmed Fuel Injection)

2. MAP Sensor Output Voltage Inspection

Disconnect the vacuum gauge and connect the hose to the MAP sensor.

Connect the test harness to ECM connectors (page 6-10).

Turn the ignition switch ON.

Measure the voltage at the test harness terminals (page 6-11).

Connection: B15 (+) –B17 (–)

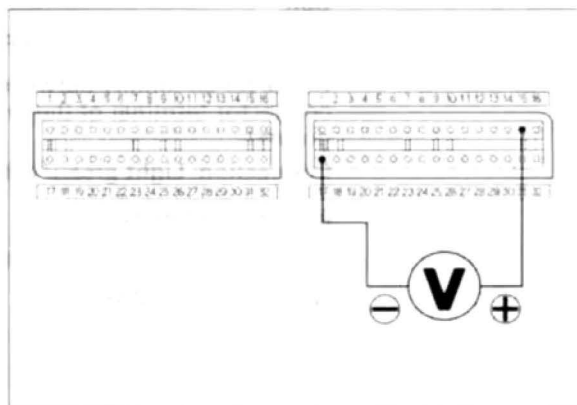
Standard: 2.7 – 3.1 V

(1,013 kPa/760 mmHg)

Is the voltage within 2.7 – 3.1 V?

YES – GO TO STEP 3.

NO – Faulty MAP sensor



3. MAP Sensor Output Voltage Inspection At Idle

Start the engine.

Measure the voltage at the test harness terminals (page 6-11).

Connection: B15 (+) –B17 (–)

Standard: 2.7 V maximum

Is the voltage less than 2.7 V?

YES – Replace the ECM with a known good one, and recheck.

NO – Faulty MAP sensor

MIL 7 BLINKS (ECT SENSOR)

- Before starting the inspection, check for loose or poor contact on the ECT sensor connector and recheck the MIL blinking.

1. ECT Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 6-10).

Turn the ignition switch ON and engine stop switch RUN.

Measure the voltage at the test harness terminals (page 6-11).

Connection: B27 (+) –B17 (–)

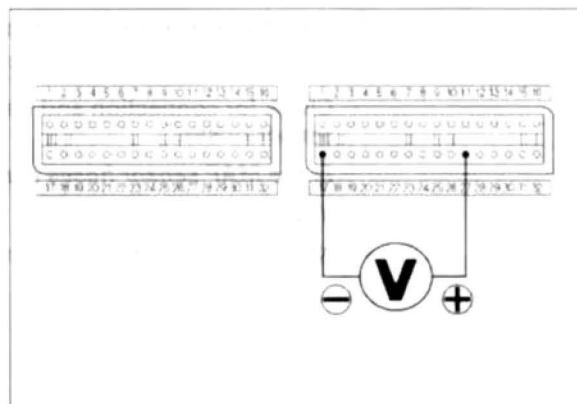
Standard: 2.7 – 3.1 V (20° C/68° F)

Is the voltage within 2.7 – 3.1 V?

YES –

- Intermittent failure
- Loose or poor contact on the ECM connector.

NO – GO TO STEP 4.



2. ECT Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P connector.

Turn the ignition switch ON and engine stop switch RUN.
Measure the voltage at the wire harness side of ECT sensor connector.

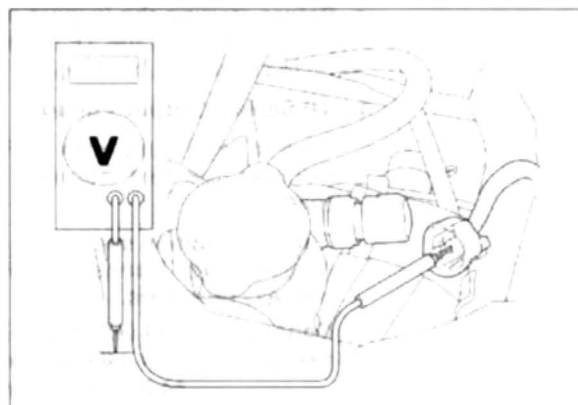
Connection: Pink/white (+) – Ground (–)

Standard: 4.75 – 5.25 V (20°C/68°F)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 3.

No – GO TO STEP 4.



3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P connector.

Measure the resistance at the ECT sensor terminals.

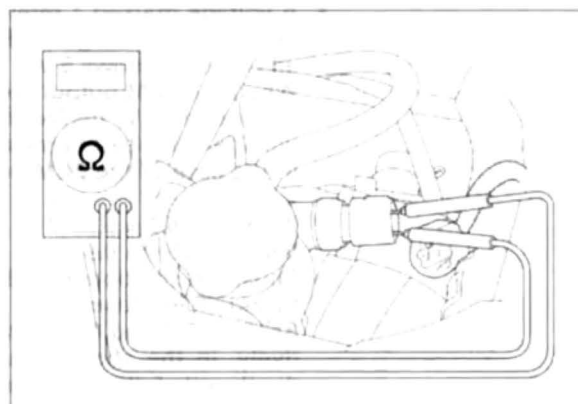
Connection: Pink (+) – Green/Orange (–) (sensor side terminals)

Standard: 2.3 – 2.6 kΩ (20°C/68°F)

Is the resistance within 2.3 – 2.6 kΩ (20°C/68°F)?

YES – GO TO STEP 4.

No – Faulty ECT sensor



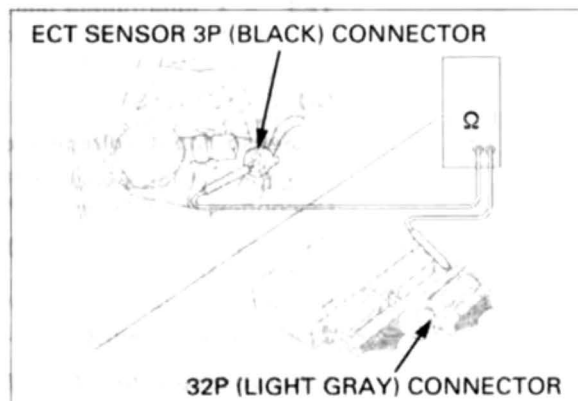
4. ECT Sensor Open Circuit Inspection

Check for continuity at the Pink/White and Green/Orange wire between the ECT sensor 3P (Black) connector terminal and the ECM connector.

Are there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Pink/White wire
• Open circuit in Green/Orange wire



5. ECT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P (Black) connector.

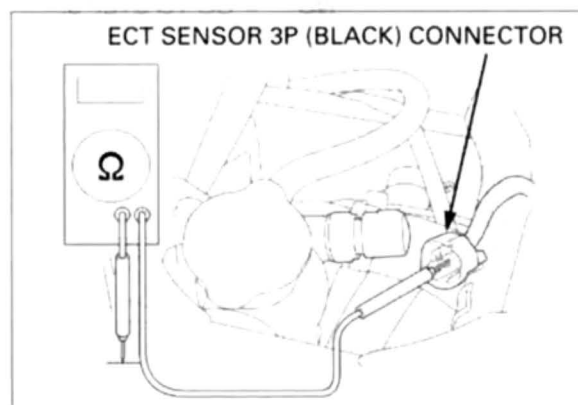
Check for continuity between the ECT sensor 3P (Black) connector terminal of the wire harness side and ground.

Connection: Pink/White – Ground

Is there continuity?

YES – Short circuit in Pink/White wire

NO – Replace the ECM with a known good one and recheck



MIL 8 BLINKS (TP SENSOR)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P connector and recheck the MIL blinking.

1. TP Sensor Output Voltage

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 6-10).

Turn the ignition switch ON.

Measure the TP sensor output voltage at the test harness terminals.

Connection: B14 (+) – B17 (–)

Standard: *0.4 – 0.6 V (throttle fully closed)

*4.2 – 4.8 V (throttle fully opened)

NOTE:

- A voltage marked * refers to the value of the ECM output voltage (STEP 3) when the voltage reading shows 5 V.
When the ECM output voltage reading shows other than 5 V, derive the TP sensor output voltage at the test harness as follows:
In the case of the ECM output voltage is 4.75 V:
 $0.4 \times 4.75 / 5.0 = 0.38 \text{ V}$
 $0.6 \times 4.75 / 5.0 = 0.57 \text{ V}$
Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.
Replace 0.4 and 0.6 with 4.2 and 4.8 respectively, in the above equations to determine the throttle fully opened range.

Is the voltage at the standard value?

YES – • Intermittent failure
• Loose or poor contact on the ECM connector

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.

Turn the ignition switch ON and engine stop switch RUN.

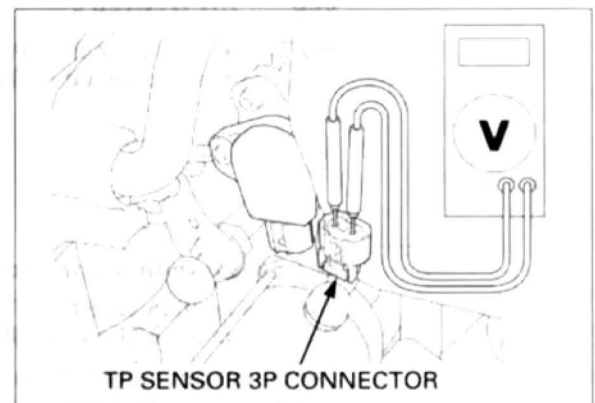
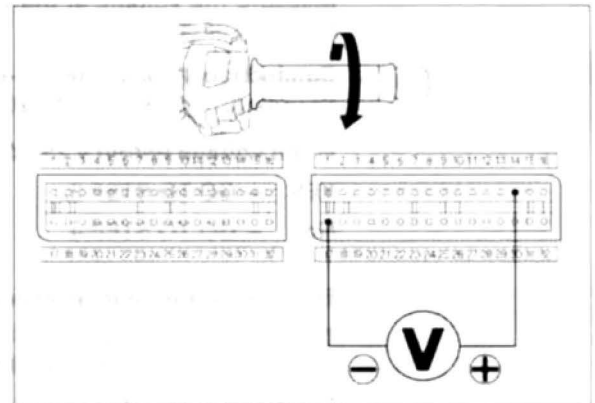
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



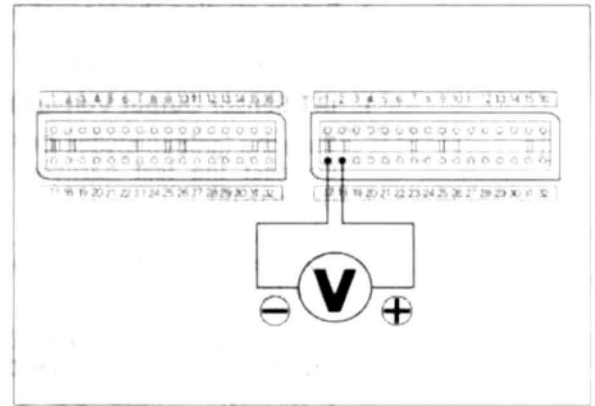
3. ECM Output Voltage Inspection

Measure the voltage at the test harness terminals.

Connection: B18 (+) – B17 (–)

Is the voltage within 4.75 – 5.25V?

- YES** – • Open circuit in Yellow/Red wire
• Open circuit in Green/Orange wire
- NO** – Replace the ECM with a new one, and recheck.



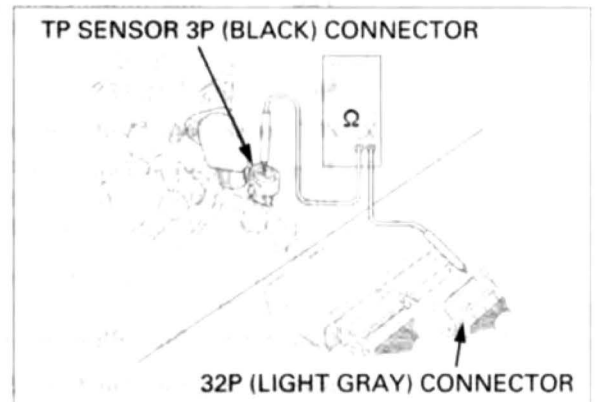
4. TP Sensor Output Line Inspection

Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ECM 32P (Light gray) connector.

Connection: Red/Yellow – B14

Is there continuity?

- YES** – GO TO STEP 5.
- NO** – Open circuit in Red/Yellow wire



5. TP Sensor Output Line Short Circuit Inspection

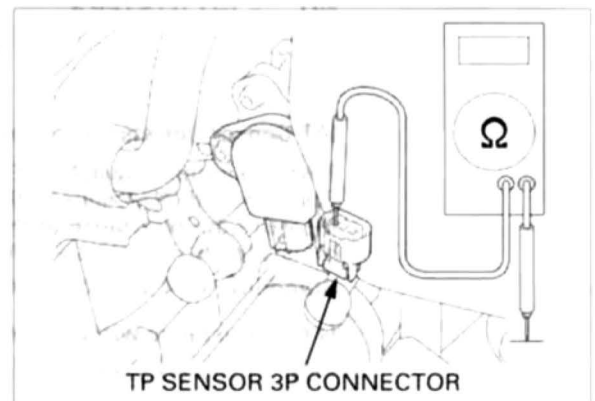
Turn the ignition switch OFF.

Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

Connection: Red/Yellow – Ground

Is there continuity?

- YES** – Short circuit in Red/Yellow wire
- NO** – Faulty TP sensor



MIL 9 BLINKS (IAT SENSOR)

- Before starting the inspection, check for loose or poor contact on the IAT sensor connector and recheck the MIL blinking.

1. IAT Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 6-10).

Turn the ignition switch ON.

Measure the voltage at the test harness terminals (page 6-11).

Connection: B30 (+) – B17 (–)

Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

- YES** –
- Intermittent failure
 - Loose or poor contact on the ECM connector

NO – GO TO STEP 2.

2. IAT Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.

Turn the ignition switch ON and engine stop switch RUN.

Measure the voltage at the wire harness side of IAT sensor 2P connector.

Connection: Gray/Blue (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

3. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.

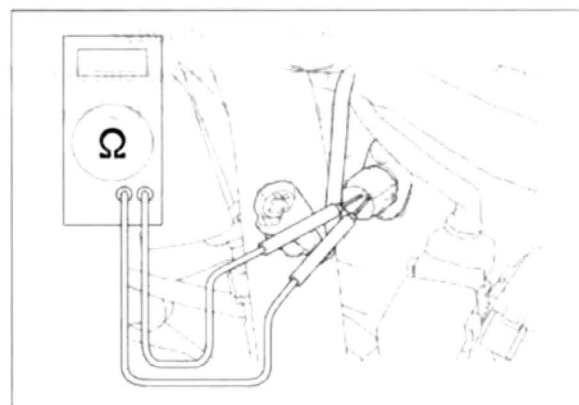
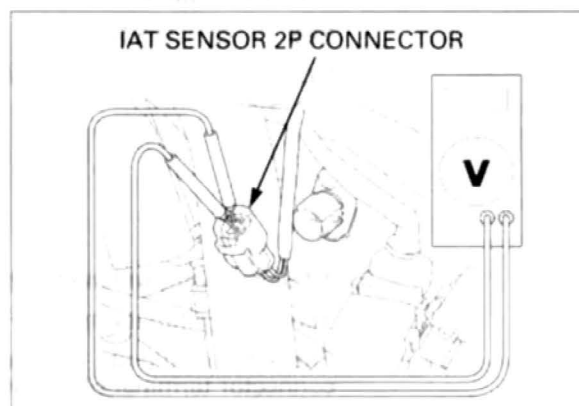
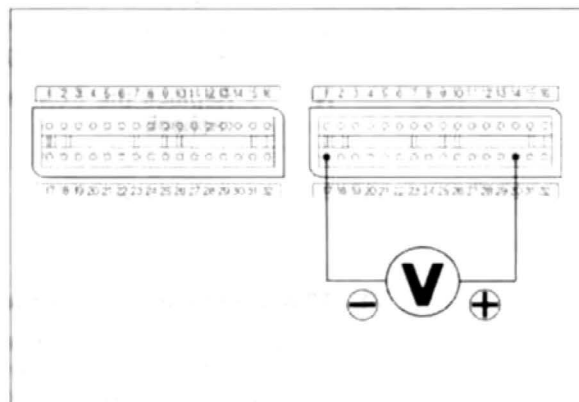
Measure the resistance at the IAT sensor 2P terminals (at 20 – 30°C/68 – 86°F).

Standard: 1 – 4 kΩ (20 – 30°C/68 – 86°F)

Is the resistance within 1 – 4 kΩ?

YES – GO TO STEP 4.

NO – Faulty IAT sensor.



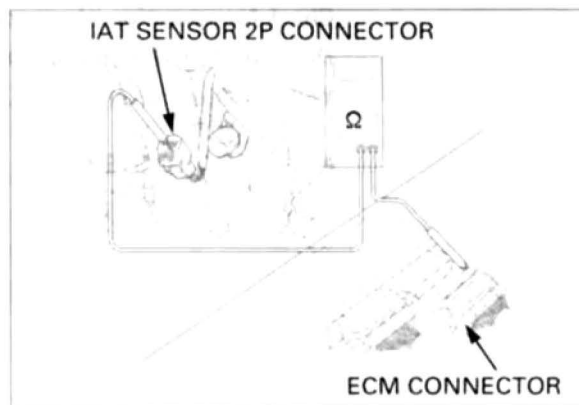
4. IAT Sensor Open Circuit Inspection

Check for continuity at the Gray/Blue and Green/Orange wire between the IAT sensor 2P connector terminal and the ECM connector.

Are there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Gray/Blue wire
• Open circuit in Green/Orange wire



5. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

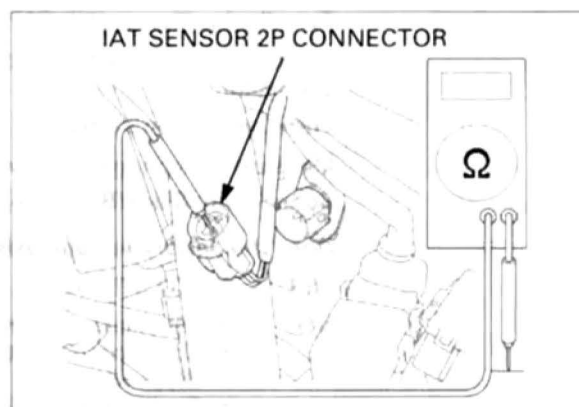
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

Connection: Gray/Blue – Ground

Is there continuity?

YES – Short circuit in Gray/Blue wire

NO – Replace the ECM with a known good one and recheck



MIL 11 BLINKS (VEHICLE SPEED SENSOR)

- Before starting the inspection, check for loose or poor contact on the vehicle speed sensor 3P (natural) connector and recheck the MIL blinking.

1. Vehicle Speed Sensor Pulse Inspection

Connect the test harness to the wire harness connectors (page 6-10).

Support the motorcycle securely and place the rear wheel off the ground.

Shift the transmission into gear.

Measure the voltage at the test harness terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

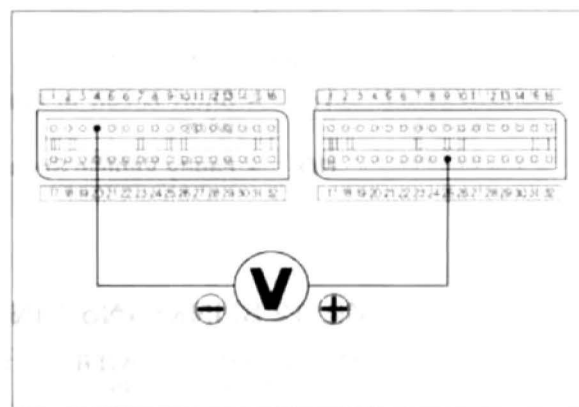
Connection: B25 (+) – A4 (-)

Standard: Repeat 0 to 5 V

Is the voltage at the standard value?

YES – • Intermittent failure
• Loose or poor contact on the ECM connector

NO – GO TO STEP 2.



FUEL SYSTEM (Programmed Fuel Injection)

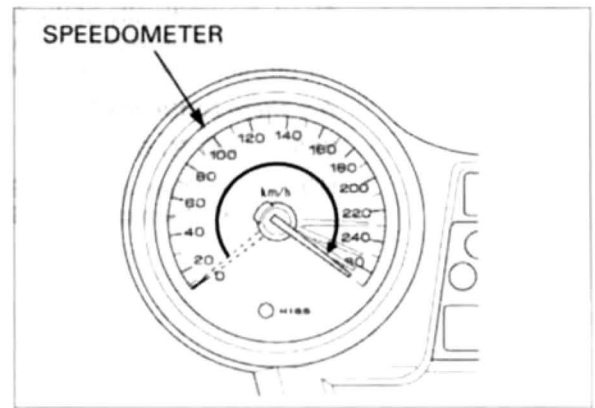
2. Combination Meter Inspection

Check for operation of speedometer.

Does the speed meter operate normal?

YES – Open or short circuit in the Pink/Green wire

NO – GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P (Natural) connector.

Turn the ignition switch ON.

Measure the voltage at the wire harness side.

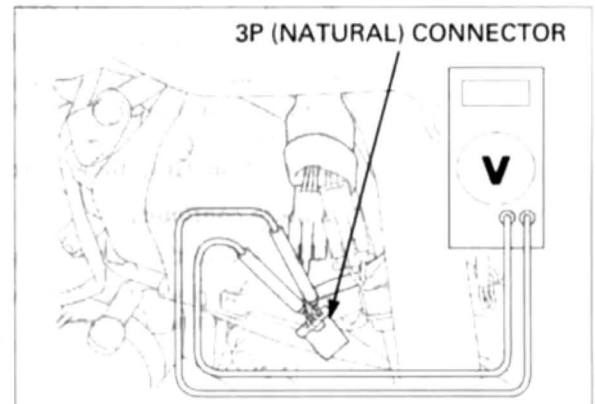
Connection: Black/Brown (+) – Green/Black (–)

Does the battery voltage exist?

YES – GO TO STEP 4.

NO –

- Open circuit in the Black/Brown wire
- Open circuit in the Green or Green/Black wire
- Faulty combination meter



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

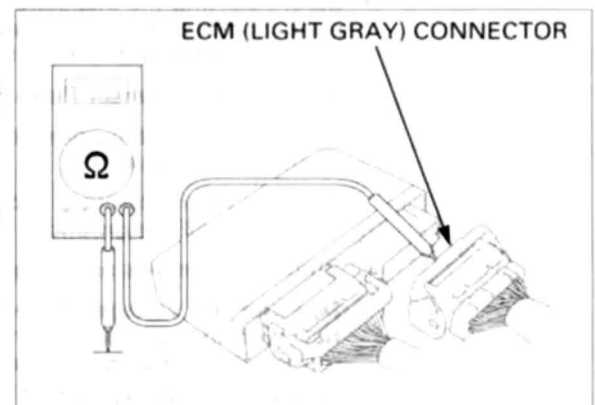
Disconnect the ECM connectors.

Check for continuity at the Pink/Green wire between the ECM connector terminal and the ground.

Is there continuity?

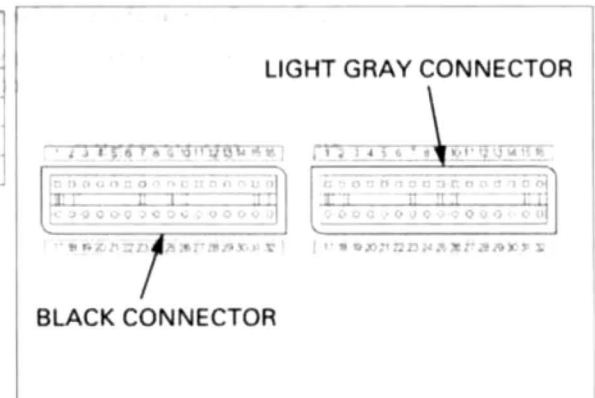
YES – Short circuit in the Pink or Pink/Green wire

NO – Faulty Vehicle Speed Sensor



MIL 12 BLINKS (No.1 INJECTOR)

MIL	INJECTOR	POWER INPUT	SIGNAL	SIGNAL AT ECM
12	No.1	Black/White	Pink/Yellow	A11
13	No.2	Black/White	Pink/Blue	A12
14	No.3	Black/White	Pink/Green	A13
15	No.4	Black/White	Pink/Black	A14



1. Injector Circuit Resistance Inspection

Turn the ignition switch OFF.

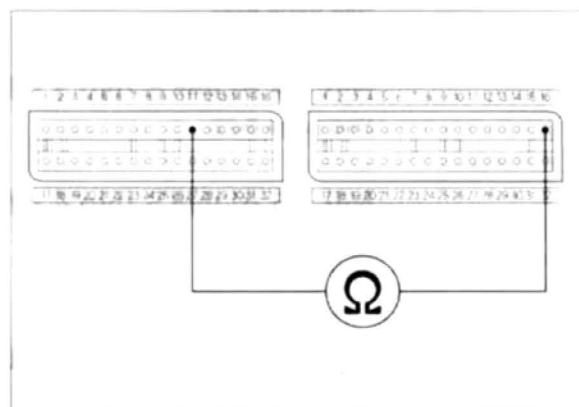
Connect the test harness to the wire harness connectors (page 6-10).
Measure the resistance of the ECM connector terminals.

Connection: POWER INPUT – SIGNAL AT ECM

Is there continuity?

YES – GO TO STEP 4.

NO – GO TO STEP 2.



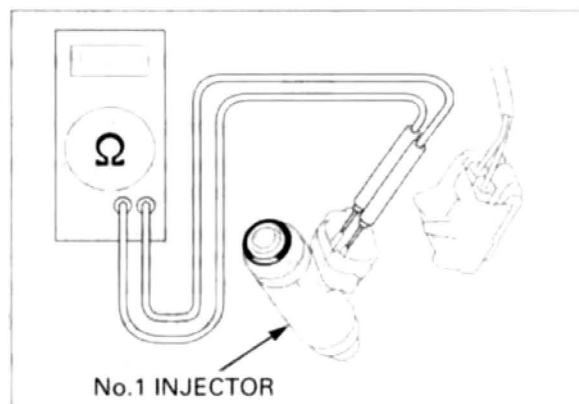
2. Injector Resistance Inspection

Disconnect the No.1 injector 2P connector and measure the resistance of the No.1 injector 2P connector terminals.

Is the resistance within 10.5 – 14.5 Ω (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty injector



3. Injector Input Voltage Inspection

Turn the ignition switch ON.

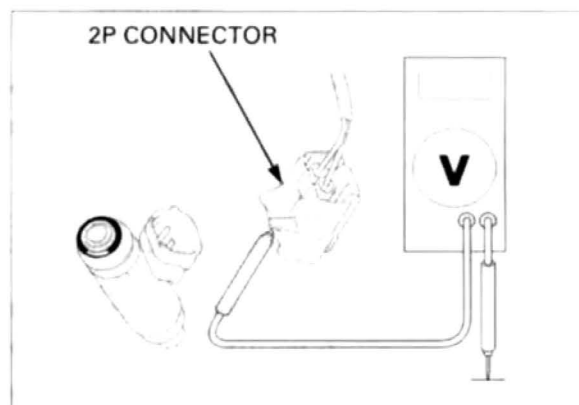
Measure the voltage between the No. 1 injector 2P connector of the wire harness side and ground.

Connection: POWER INPUT (+) – Ground (-)

Does the battery voltage exist?

YES – Open circuit in SIGNAL line wire

NO – Open circuit in POWER INPUT line wire



4. Injector Signal Line Short Circuit Inspection

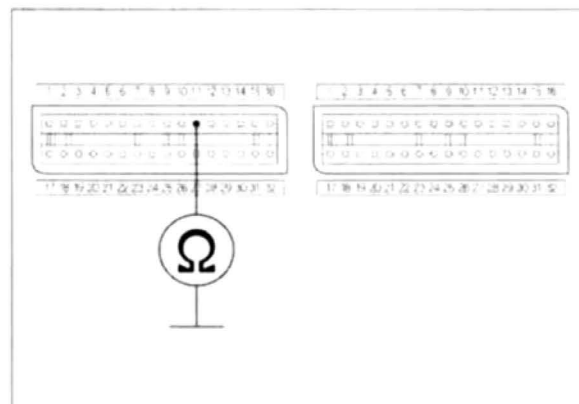
Check for continuity between the ECM connector terminal and ground.

Connection: SIGNAL AT ECM – Ground

Is there continuity?

YES – • Short circuit in the SIGNAL line wire
• Faulty injector

NO – Replace the ECM with a new one, and recheck.



FUEL SYSTEM (Programmed Fuel Injection)

MIL 13 BLINKS (No.2 INJECTOR)

See page 6-22

MIL 14 BLINKS (No.3 INJECTOR)

See page 6-22

MIL 15 BLINKS (No.4 INJECTOR)

See page 6-22

MIL 18 BLINKS (CAM PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the cam pulse generator connector and recheck the MIL blinking.

1. Cam Pulse Generator Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the test harness to the wire harness connectors (page 6-10).

Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the test harness terminals.

Connection: B10 (+) – A31 (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

- YES** – • Intermittent failure
• Loose or poor contact on the ECM connector

NO – GO TO STEP 2.

2. Cam Pulse Generator Peak Voltage Inspection

Disconnect the cam pulse generator 2P (Natural) connector.

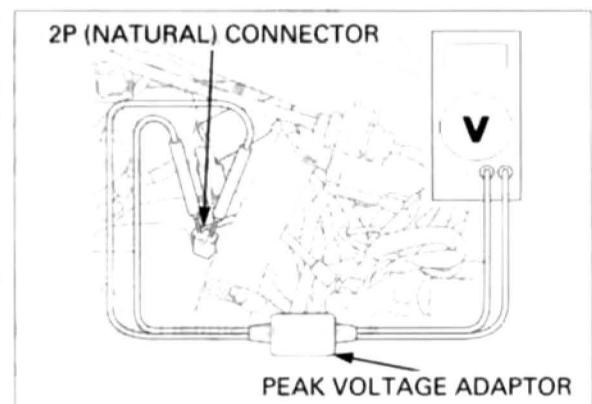
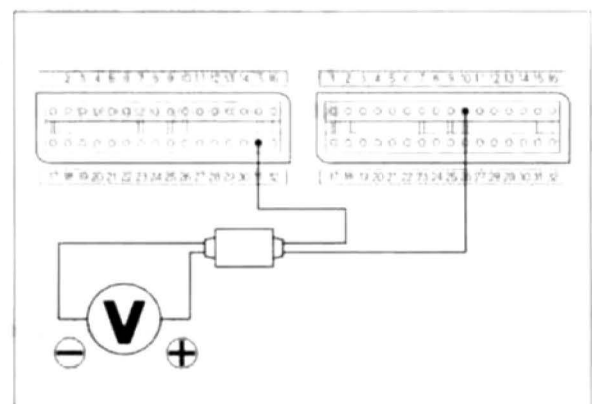
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P (Natural) connector.

Connection: Gray (+) – White (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

- YES** – Open or short circuit in the Green/Orange or Gray wire

NO – Faulty cam pulse generator



3. Cam Pulse Generator Short Circuit Inspection

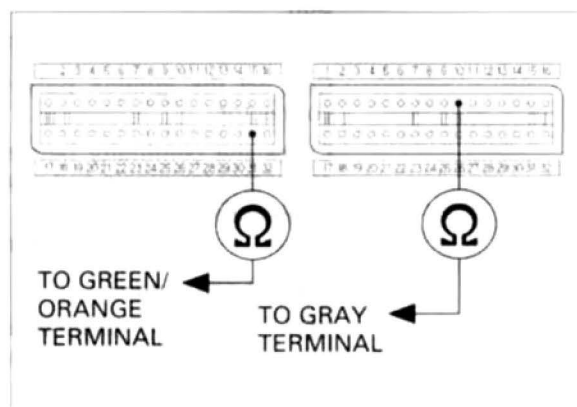
Turn the ignition switch OFF.

Check the continuity between the ECM connector terminals and the cam pulse generator 2P (Natural) connector.

**Connection: B10 – Gray
A31 – Green/Orange**

Is there continuity?

- YES** – • Short circuit in the Gray wire
• Short circuit in the Green/Orange wire
- NO** – • Open circuit in the Green/Orange wire
• Open circuit in the Gray wire



MIL 19 BLINKS (IGNITION PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the ignition pulse generator connector and recheck the MIL blinking.

1. Ignition Pulse Generator Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the test harness to the wire harness connectors (page 6-10).

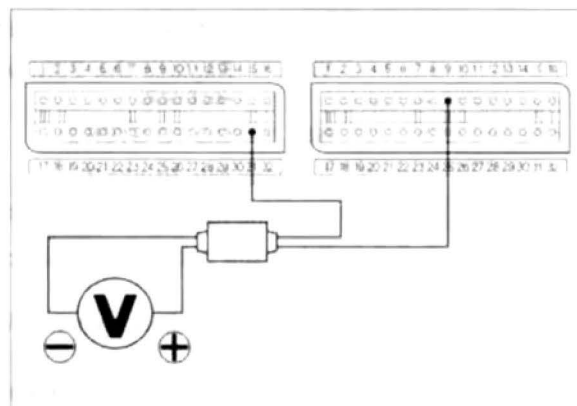
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the test harness terminals.

Connection: B9 (+) – A31 (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

- YES** – • Intermittent failure
• Loose or poor contact on the ECM connector

NO – GO TO STEP 2.



2. Ignition Pulse Generator Peak Voltage Inspection

Disconnect the ignition pulse generator 2P (Red) connector.

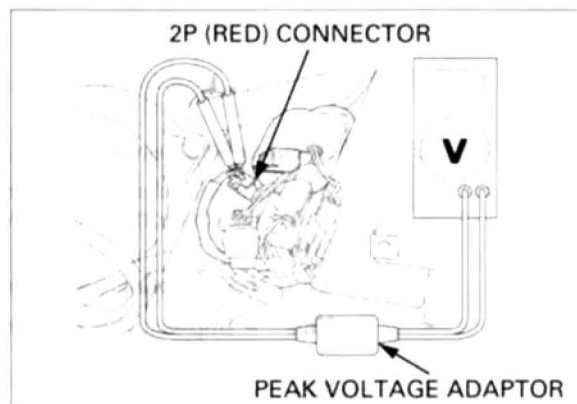
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P (Red) connector.

Connection: Yellow (+) – White/Yellow (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

- YES** – Open or short circuit in the Yellow, Green/Orange or White/Yellow wire

NO – Faulty ignition pulse generator



3. Ignition Pulse Generator Short Circuit Inspection

Turn the ignition switch OFF.

Connect the ignition pulse generator 2P (Red) connector.

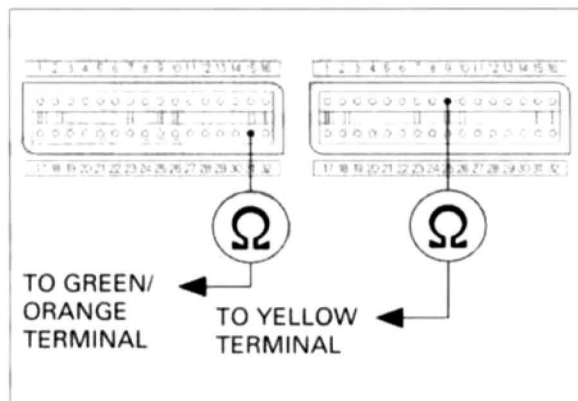
Check the continuity between the test harness connector terminals and ground.

Connection: B9 – Yellow

A31 – Green/Orange

Is there continuity?

- YES**
- Short circuit in the Yellow wire
 - Short circuit in the Green/Orange wire
- NO**
- Open circuit in the Yellow wire
 - Open circuit in the Green/Orange wire



MIL 33 BLINKS (E²-PROM)

1. Recheck MIL Brinks 1

Reset the self-diagnosis memory data (page 6-9).
Turn the ignition switch ON and check that the MIL blinks.

Does the MIL blink 33 times?

- YES**
- Replace the ECM with a new one, and recheck.
- NO**
- GO TO STEP 2.

2. Recheck MIL Brinks 2

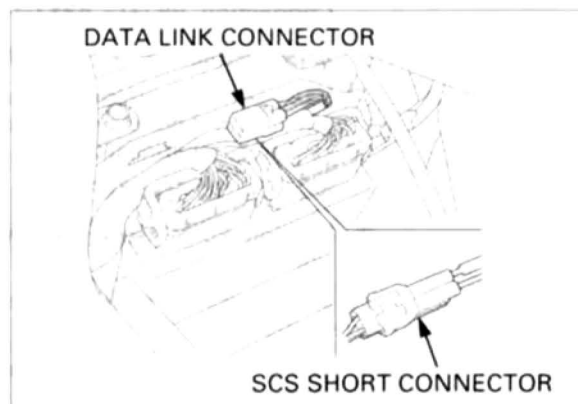
Turn the ignition switch OFF.

Short the data link connector with a special tool (page 6-8).

Turn the ignition switch ON and check that the MIL blinks.

Does the MIL blink 33 times?

- YES**
- GO TO STEP 3.
- NO**
- Intermittent failure



3. Recheck MIL Brinks 3

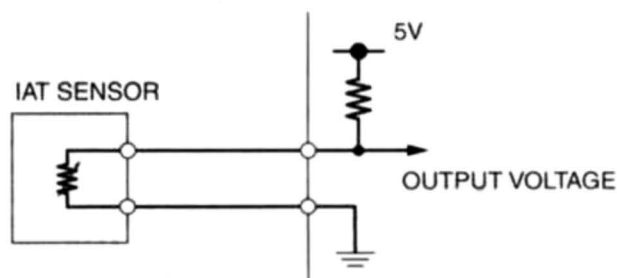
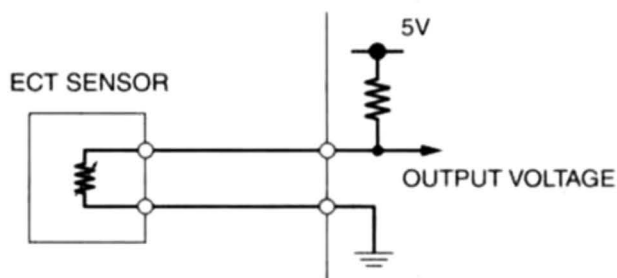
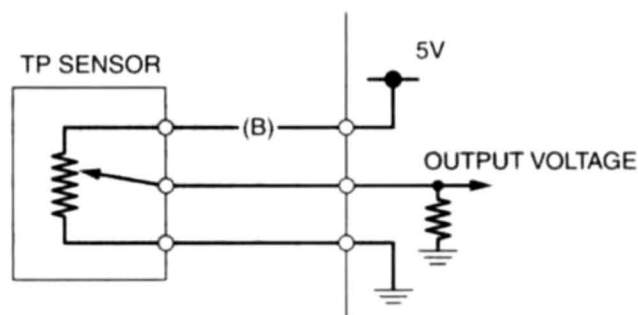
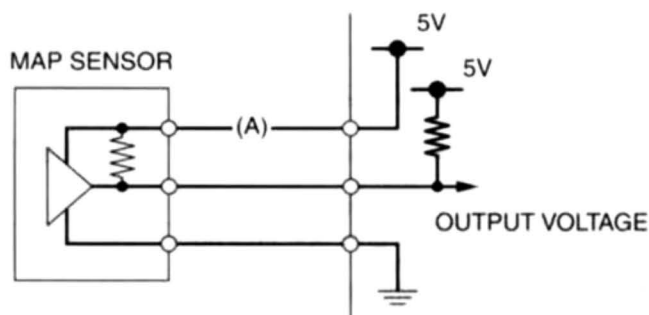
Reset the self-diagnosis memory data (page 6-9).
Turn the ignition switch ON and check that the MIL blinks.

Does the MIL blink 33 times?

- YES**
- Replace the ECM with a new one, and recheck.
- NO**
- Intermittent failure

DTC CODE INDEX

- The Diagnostic Trouble Codes (DTC) are based upon Malfunction Indicator Lamp (MIL) codes and are displayed as hyphenated numbers. The digits in front of the hyphen are equal to an MIL code and indicate the Function Failure. The digit behind the hyphen details the symptom. For example, in the case of the TP sensor, the ECM stores two levels of information, a function failure and a detail of the symptom:
(08 - 1) = TP sensor voltage - *lower* than the specified value
or
(08 - 2) = TP sensor voltage - *higher* than the specified value.
- The MAP, ECT, TP and IAT sensor can be made diagnoses according to the sensor output voltage value. If the failure occurs, the ECM determines the failure function, the output voltage is high or low compared to the standard voltage, then read out the DTC to the HDS Pocket Tester.
For example:
 - If the input voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be read out.
 - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be read out.



FUEL SYSTEM (Programmed Fuel Injection)

DTC	Detection Item	Causes	Symptoms	Refer to
-	ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine does not start MIL does not blink 	6-83
-	ECM power input circuit malfunction	<ul style="list-style-type: none"> Open circuit at the power input wire of the ECM Faulty bank angle sensor Open circuit in bank angle sensor related circuit Faulty engine stop relay Open circuit in engine stop relay related wires Faulty engine stop switch Open circuit in engine stop switch related wires Faulty ignition switch Blown PGM-FI fuse (20 A) Open circuit in engine stop switch ground Blown sub-fuse (10 A) (Starter/ignition) 	<ul style="list-style-type: none"> Engine does not start MIL does not blink 	6-83
-	ECM output line malfunction	<ul style="list-style-type: none"> ECM output voltage line (Yellow/Red wire) short circuit 	<ul style="list-style-type: none"> Engine does not start 	-
-	MIL circuit malfunction	<ul style="list-style-type: none"> Faulty ECM Open or short circuit in MIL wire 	<ul style="list-style-type: none"> Engine operates normally MIL does not blink 	6-8
-	Data link circuit malfunction	<ul style="list-style-type: none"> Short circuit in data link connector Faulty ECM Short circuit in data link connector wire 	<ul style="list-style-type: none"> Engine operates normally MIL stays lit 	-
1-1	MAP sensor circuit low voltage	<ul style="list-style-type: none"> Open or short circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	6-30
1-2	MAP sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on MAP sensor connector Open circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	6-31
2-1	MAP sensor performance problem	<ul style="list-style-type: none"> Loose or poor connection of the MAP sensor vacuum tube Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	6-32
7-1	ECT sensor circuit low voltage	<ul style="list-style-type: none"> Short circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F) 	6-33
7-2	ECT sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on ECT sensor Open circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F) 	6-33
8-1	TP sensor circuit low voltage	<ul style="list-style-type: none"> Loose or poor contact on TP sensor connector Open or short circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine performance and response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	6-34
8-2	TP sensor circuit high voltage	<ul style="list-style-type: none"> Open circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine performance and response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	6-36
9-1	IAT sensor circuit low voltage	<ul style="list-style-type: none"> Short circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F) 	6-36
9-2	IAT sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on IAT sensor Open circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F) 	6-37

FUEL SYSTEM (Programmed Fuel Injection)

DTC	Detection Item	Causes	Symptoms	Refer to
11-1	Vehicle speed sensor no signal (circuit malfunction)	<ul style="list-style-type: none"> • Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector • Faulty vehicle speed sensor 	<ul style="list-style-type: none"> • Engine operates normally (Simulate using numerical values; 5 km/h) 	6-38
12-1	No.1 injector circuit malfunction	<ul style="list-style-type: none"> • Loose or poor contact on No.1 injector connector • Open or short circuit in No.1 injector wire • Faulty No.1 injector 	<ul style="list-style-type: none"> • Engine does not start 	6-39
13-1	No.2 injector circuit malfunction	<ul style="list-style-type: none"> • Loose or poor contact on No.2 injector connector • Open or short circuit in No.2 injector wire • Faulty No.2 injector 	<ul style="list-style-type: none"> • Engine does not start 	6-40
14-1	No.3 injector circuit malfunction	<ul style="list-style-type: none"> • Loose or poor contact on No.3 injector connector • Open or short circuit in No.3 injector wire • Faulty No.3 injector 	<ul style="list-style-type: none"> • Engine does not start 	6-40
15-1	No.4 injector circuit malfunction	<ul style="list-style-type: none"> • Loose or poor contact on No.4 injector connector • Open or short circuit in No.4 injector wire • Faulty No.4 injector 	<ul style="list-style-type: none"> • Engine does not start 	6-40
18-1	Cam pulse generator no signal	<ul style="list-style-type: none"> • Loose or poor contact on cam pulse generator • Open or short circuit in cam pulse generator • Faulty cam pulse generator 	<ul style="list-style-type: none"> • Engine does not start 	6-41
19-1	Ignition pulse generator no signal	<ul style="list-style-type: none"> • Loose or poor contact on ignition pulse generator • Open or short circuit in ignition pulse generator • Faulty ignition pulse generator 	<ul style="list-style-type: none"> • Engine does not start 	6-41
33-1	E ² -PROM in ECM malfunction	<ul style="list-style-type: none"> • Faulty ECM 	<ul style="list-style-type: none"> • Engine operates normally • Does not hold the self-diagnosis data 	6-42

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

1. MAP Sensor System Inspection

Turn the ignition switch ON and engine stop switch RUN.

Check the MAP sensor with the HDS.

Is about 0 V or below indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the MAP sensor connector

2. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector.

Turn the ignition switch ON.

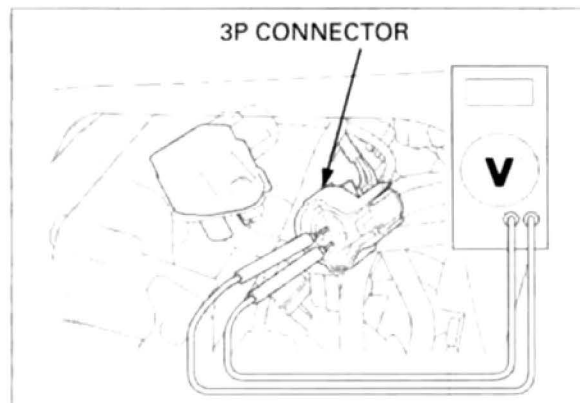
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (-)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.

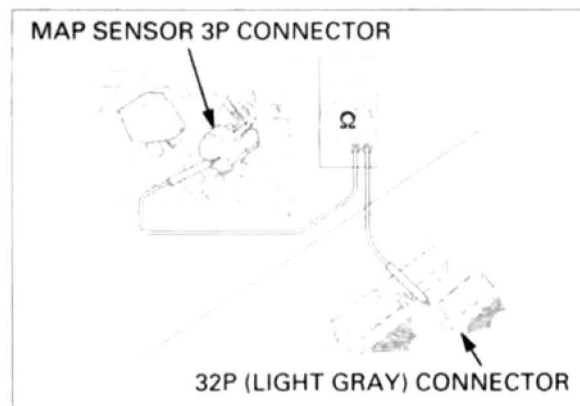
Disconnect the ECM connectors.

Check for continuity at the Yellow/Red wire between the MAP sensor 3P connector terminal and the ECM connectors.

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – Open circuit in Yellow/Red wire



4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector and ECM connector.

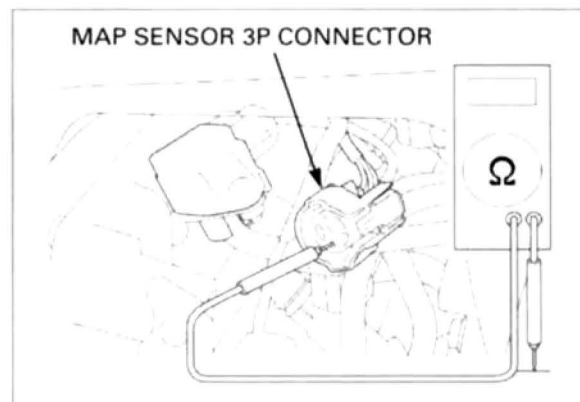
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

Connection: Light green/Yellow – Ground

Is there continuity?

YES – Short circuit in Light green/Yellow wire

NO – GO TO STEP 5.



5. MAP Sensor Inspection

Replace the MAP sensor with a new one (page 6-75).

Reset the ECM (page 6-9).

Turn the ignition switch ON.

Check the MAP sensor with the HDS.

Is DTC 1-1 indicated?

YES – Replace the ECM with a know good one, and recheck.

NO – Faulty original MAP sensor

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the DTC.

1. MAP Sensor System Inspection 1

Turn the ignition switch ON.

Check the MAP sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the MAP sensor connector

2. MAP Sensor System Inspection 2

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector.

Connect the MAP sensor terminals at the wire harness side with a jumper wire.

Connection: Light green/Yellow – Green/Orange

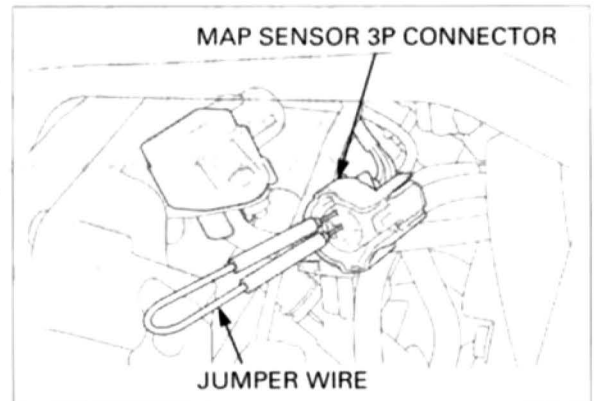
Turn the ignition switch ON and engine stop switch RUN.

Check the MAP sensor with the HDS.

Is about 0 V indicated?

YES – Faulty MAP sensor

NO – GO TO STEP 3.



3. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Remove the jumper wire.

Turn the ignition switch ON and engine stop switch RUN.

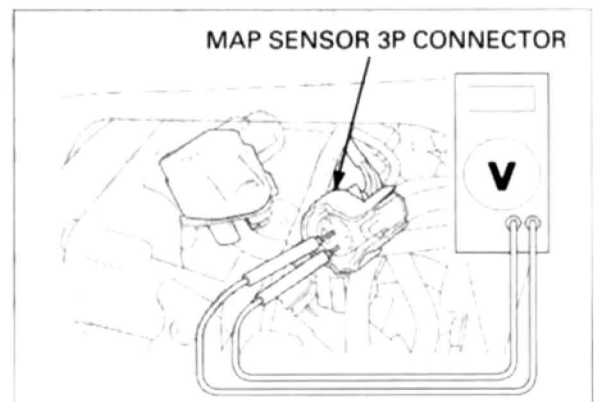
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO – Open circuit in Green/Orange wire



4. MAP Sensor Output Line Open Circuit Inspection

Disconnect the ECM connectors.
Check for continuity at the Light green/Yellow wire between the MAP sensor 3P connector terminal and the ECM connector.

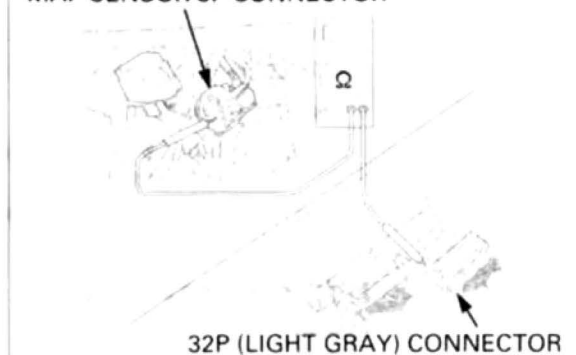
Connection: B15 (+) – Light green/Yellow (–)

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – Open circuit in Light green/Yellow wire

MAP SENSOR 3P CONNECTOR



DTC 2-1 (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the DTC.

1. MAP Sensor System Inspection

Turn the ignition switch ON.

Start the engine and check the MAP sensor with the HDS at idle speed.

Is 1.6 V indicated?

YES – Intermittent failure

NO – GO TO STEP 2.

2. Manifold Absolute Pressure Test

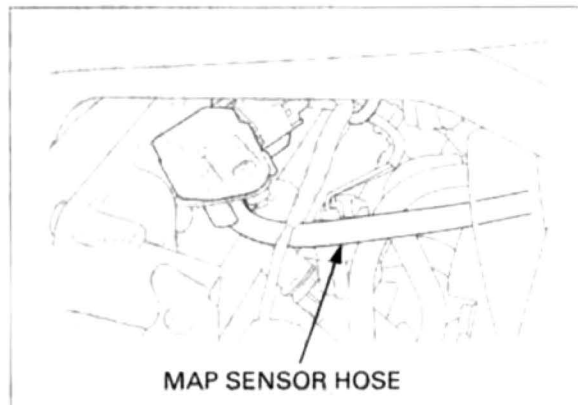
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor hoses.

Is the MAP sensor vacuum hoses connection correct?

YES – GO TO STEP 3.

NO – Correct the hose installation



3. MAP Sensor System Inspection

Replace the MAP sensor with a new one (page 6-75).

Turn the ignition switch ON.

Start the engine and check the MAP sensor with the HDS at idle speed.

Is 1.6 V indicated?

YES – Faulty original MAP sensor

NO – Replace the ECM with a known good one, and recheck.

DTC 7-1 (ECT SENSOR LOW VOLT-AGE)**1. ECT Sensor System Inspection**

Turn the ignition switch ON and engine stop switch RUN.

Check the ECT sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the ECT sensor connector

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Black) connector.

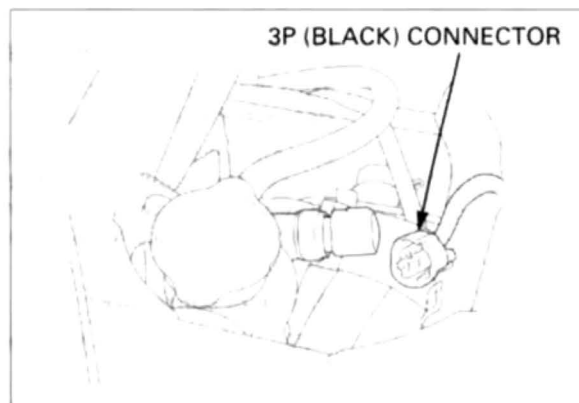
Turn the ignition switch ON.

Check the ECT sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty ECT sensor

**3. ECT Sensor Output Line Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Black) connector.

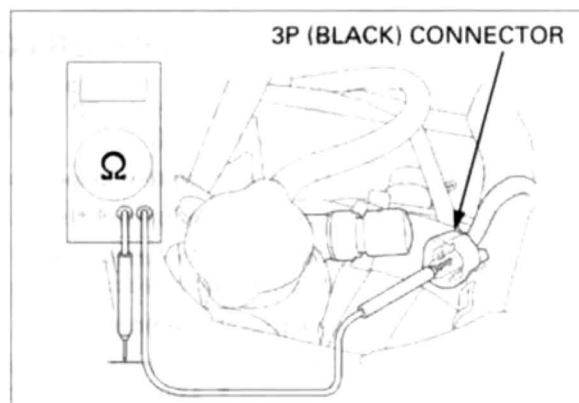
Check for continuity between the ECT sensor 3P (Black) connector terminal of the wire harness side and ground.

Connection: Pink/White – Ground

Is there continuity?

YES – Short circuit in Pink/White wire

NO – Replace the ECM with a new one, and recheck.

**DTC 7-2 (ECT SENSOR HIGH VOLT-AGE)**

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P (Black) connector and recheck the DTC.

1. ECT Sensor System Inspection

Turn the ignition switch ON.

Check the ECT sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the ECT sensor 3P (Black) connector

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Black) connector. Connect the ECT sensor terminals with a jumper wire.

Connection: Pink/White – Green/Orange

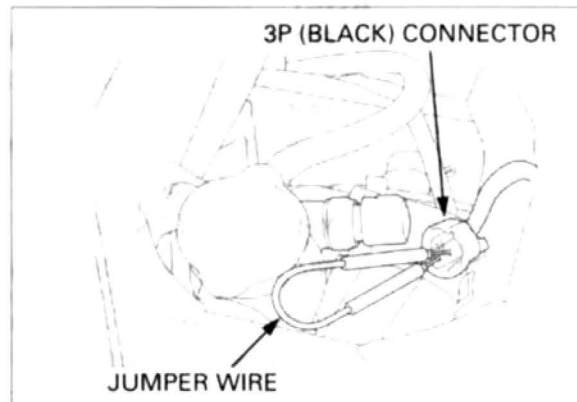
Turn the ignition switch ON.

Check the ECT sensor with the HDS.

Is about 0 V indicated?

YES – Faulty ECT sensor

NO – GO TO STEP 3.



3. ECT Sensor Output Line Inspection

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the ECM connector.

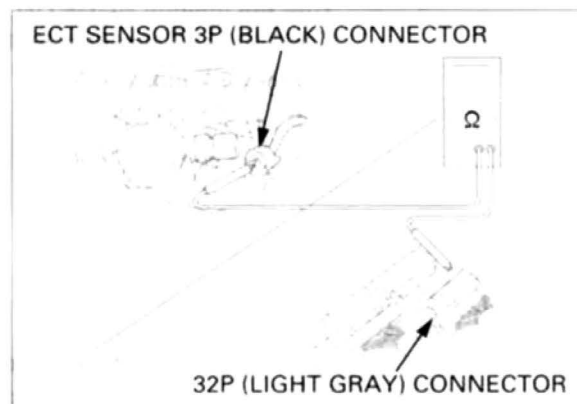
Check for continuity at the Pink/White and Green/Orange wire between the ECT sensor 3P (Black) connector terminal and the ECM connector.

Are there continuity?

YES – Replace the ECM with a new one, and recheck.

NO –

- Open circuit in Pink/White wire
- Open circuit in Green/Orange wire



DTC 8-1 (TP SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P connector and recheck the DTC.

1. TP Sensor System Inspection

Turn the ignition switch ON.

Check the TP sensor with the HDS when the throttle fully closed.

Is about 0 V indicated?

YES –

- Intermittent failure
- Loose or poor contact on the TP sensor connector

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.

Turn the ignition switch ON.

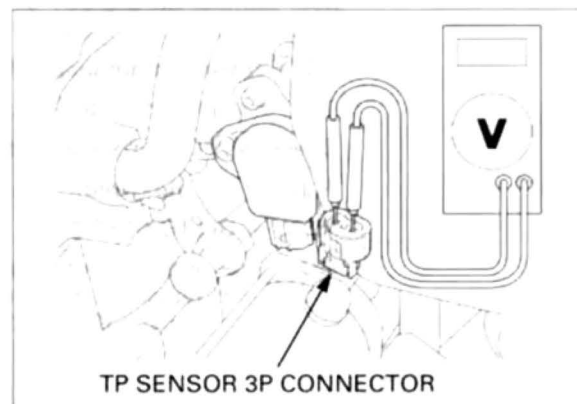
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. TP Sensor Circuit Inspection

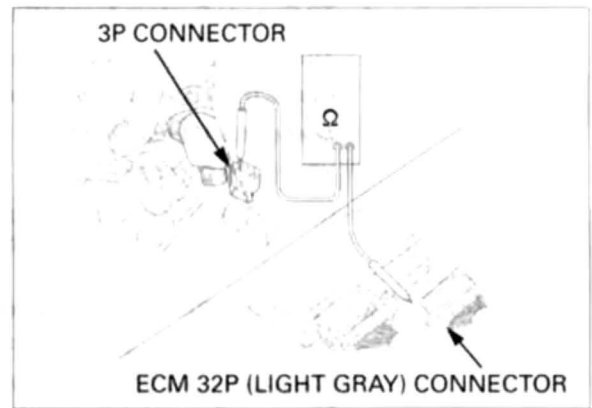
Disconnect the ECM connector.
Check for continuity at the Yellow/Red wire between the TP sensor 3P connector terminal and the ECM connector.

Connection: B18 (+) – Yellow/Red (–)

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – Open circuit in Yellow/Red wire

**4. TP Sensor Output Line Open Circuit Inspection**

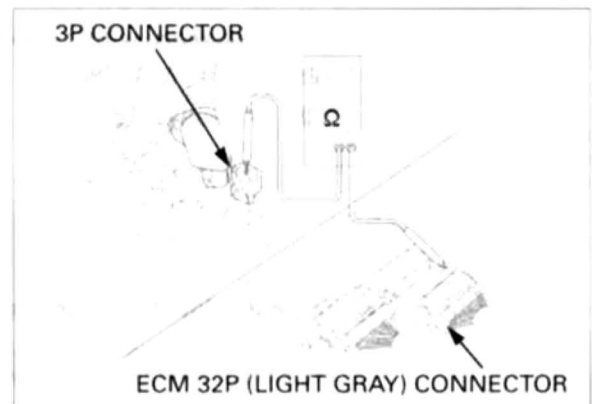
Turn the ignition switch OFF.
Check for continuity at the Red/Yellow wire between the TP sensor 3P connector terminal and the ECM connector.

Connection: B14 (+) – Red/Yellow (–)

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Red/Yellow wire

**5. TP Sensor Output Line Short Circuit Inspection**

Disconnect the TP sensor 3P connector.

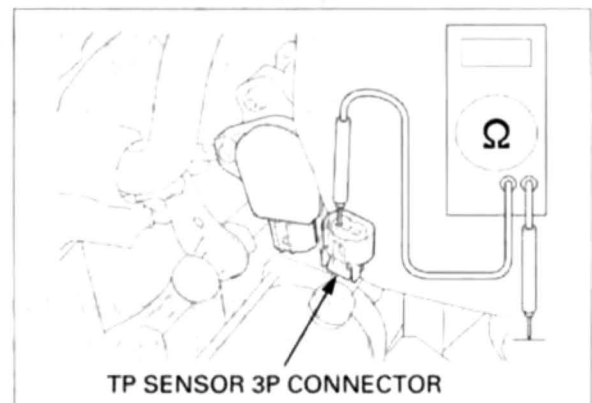
Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

Connection: Red/Yellow – Ground

Is there continuity?

YES – Short circuit in Red/Yellow wire

NO – GO TO STEP 6.

**6. TP Sensor Inspection**

Replace the TP sensor with a new one.
Turn the ignition switch ON.

Reset the ECM (page 6-9).

Check the TP sensor with the HDS.

Is DTC 8-1 indicated?

YES – Replace the ECM with a known good one, and recheck.

NO – Faulty original TP sensor

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. TP Sensor System Inspection

Turn the ignition switch ON.

Check the TP sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure
- Loose or poor contact on the TP sensor connector

2. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.

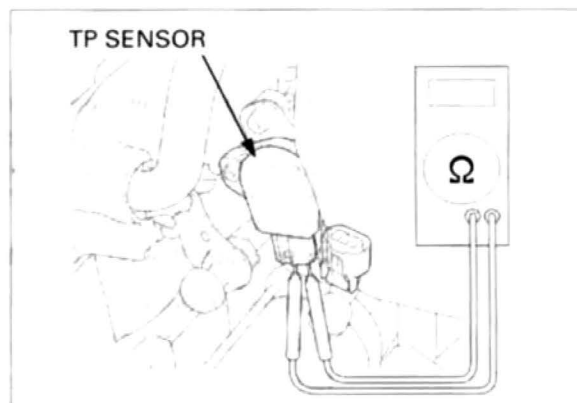
Measure the resistance at the TP sensor side.

Connection: Red/Yellow – Green/Orange

Is the resistance within 0.4 – 0.6 Ω ?

YES – GO TO STEP 3.

NO – Faulty TP sensor



3. TP Sensor Input Voltage Inspection

Turn the ignition switch ON.

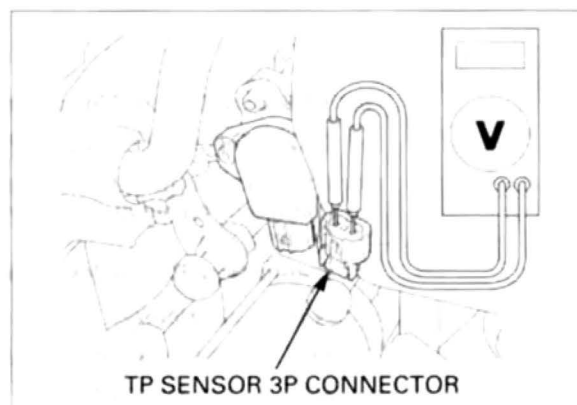
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (-)

Is the voltage within 4.75 – 5.25 V?

YES – Replace the ECM with a know good one, and recheck.

NO – Open circuit in Green/Orange wire



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. IAT Sensor System Inspection

Turn the ignition switch ON.

Check the IAT 2P sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure
- Loose or poor contact on the IAT sensor 2P connector

2. IAT Sensor Inspection

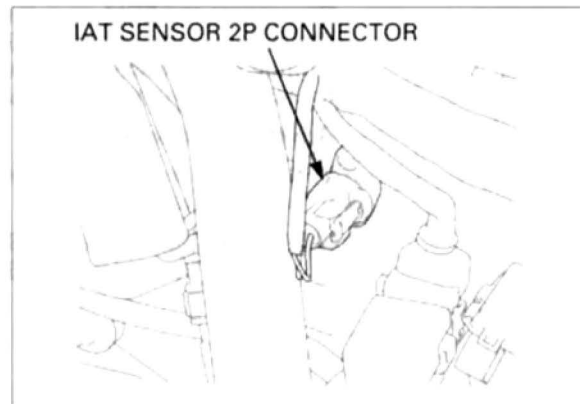
Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

Turn the ignition switch ON.
Check the IAT sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor



3. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

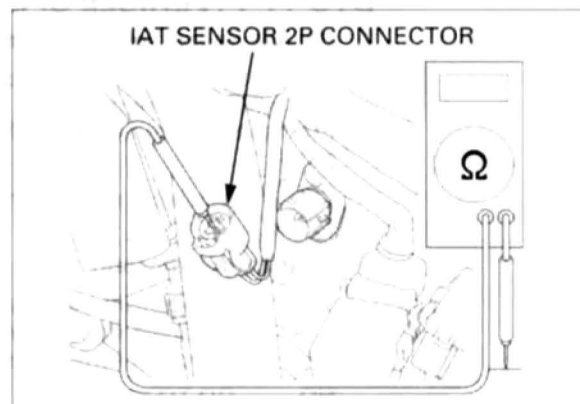
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

Connection: Gray/Blue – Ground

Is there continuity?

YES – Short circuit in Gray/Blue wire

NO – Replace the ECM with a known good one, and recheck.



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the IAT sensor connector and recheck the DTC.

1. IAT Sensor System Inspection

Turn the ignition switch ON.
Check the IAT sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the IAT sensor 2P connector

2. IAT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.
Connect the IAT sensor terminals with a jumper wire.

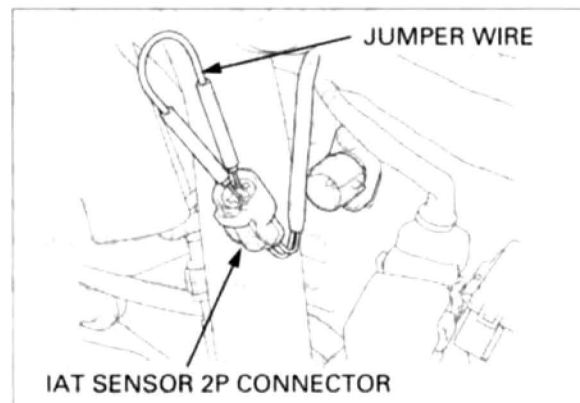
Connection: Gray/Blue – Green/Orange

Turn the ignition switch ON.
Check the IAT sensor with the HDS.

Is about 0 V indicated?

YES – Faulty IAT sensor

NO – GO TO STEP 3.



FUEL SYSTEM (Programmed Fuel Injection)

3. IAT Sensor Output Line Inspection

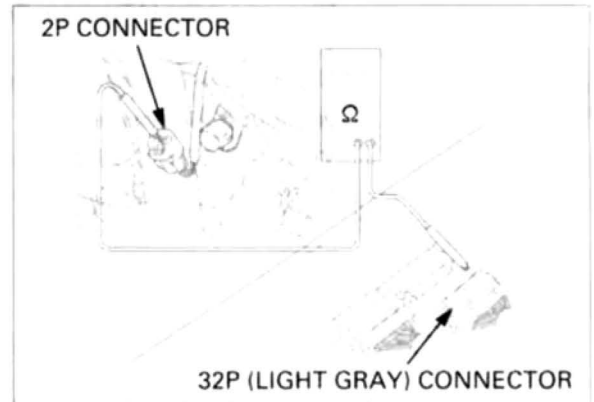
Disconnect the ECM connector.
Check for continuity at the Gray/Blue and Green/Orange wire between the IAT sensor 2P connector terminal and the ECM connector.

Are there continuity?

YES – Replace the ECM with a new one, and recheck.

NO –

- Open circuit in Gray/Blue wire
- Open circuit in Green/Orange wire



DTC 11-1 (VEHICLE SPEED SENSOR)

1. Vehicle Speed Sensor System Inspection

Support the motorcycle securely and place the rear wheel off the ground.
Start the engine and shift the transmission into gear.

Check the vehicle speed sensor with the HDS at 10 km/h.

Is 10 km/h indicated?

YES –

- Intermittent failure
- Loose or poor contact on the vehicle speed sensor connector

NO – GO TO STEP 2.

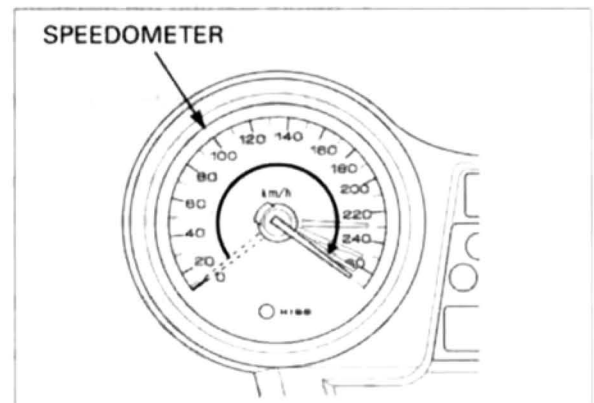
2. Combination Meter Inspection

Check for operation of speedometer.

Does the speed meter operate normally?

YES – Open or short circuit in the Pink/Green wire

NO – GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P (Natural) connector.

Turn the ignition switch ON.

Measure the voltage at the wire harness side.

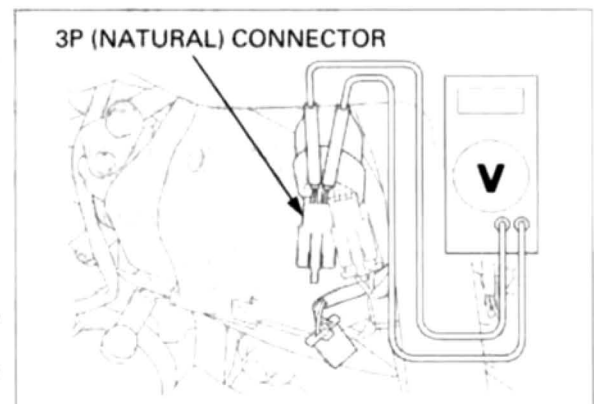
Connection: Black/Brown (+) – Green/Black (–)

Does the battery voltage exist?

YES – GO TO STEP 4.

NO –

- Open circuit in the Black or Black/Brown wire
- Open circuit in the Green or Green/Black wire
- Faulty combination meter



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM connector.

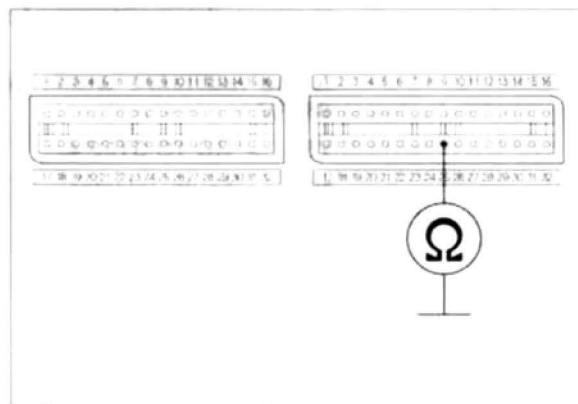
Check for continuity at the Pink/Green wire between the ECM connector terminal and the ground.

Connection: B25 – Ground

Is there continuity?

YES – Short circuit in the Pink or Pink/Green wire

NO – Inspect vehicle speed sensor (page 19-15)



DTC 12-1 (No.1 INJECTOR)

DTC	INJECTOR	POWER INPUT	SIGNAL	SIGNAL AT ECM
12-1	No.1	Black/White	Pink/Yellow	A11
13-1	No.2	Black/White	Pink/Blue	A12
14-1	No.3	Black/White	Pink/Green	A13
15-1	No.4	Black/White	Pink/Black	A14



1. Injector System Inspection

Reset the ECM (page 6-9).
Start the engine and check the injector with the HDS.

Is the DTC 12-1 indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the injector connector

2. Injector Circuit Resistance Inspection

Turn the ignition switch OFF.

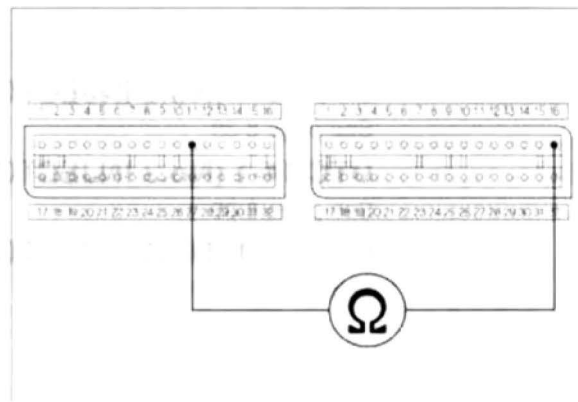
Disconnect the ECM connector and measure the resistance of the ECM connector terminals.

Connection: POWER INPUT – SIGNAL AT ECM

Is there continuity?

YES – GO TO STEP 5.

NO – GO TO STEP 3.



FUEL SYSTEM (Programmed Fuel Injection)

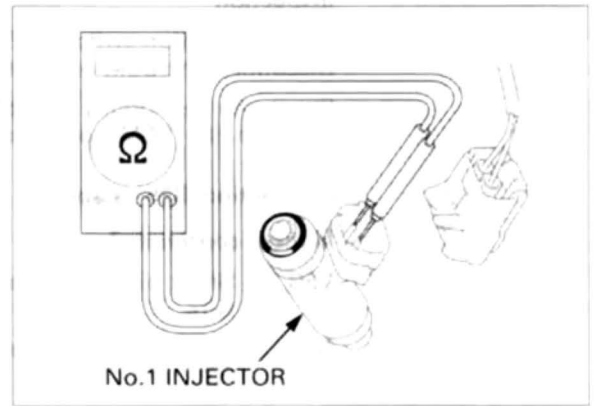
3. Injector Resistance Inspection

Disconnect the No.1 injector 2P connector and measure the resistance of the No.1 injector 2P connector terminals.

Is the resistance within 10.5 – 14.5 Ω (20°C/ 68°F)?

YES – GO TO STEP 4.

NO – Faulty injector



4. Injector Input Voltage Inspection

Turn the ignition switch ON.

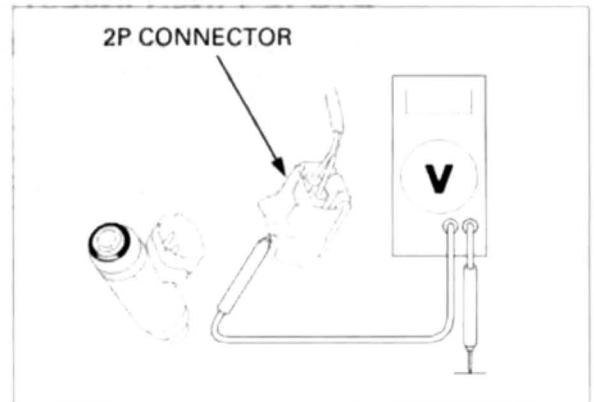
Measure the voltage between the No. 1 injector 2P connector of the wire harness side and ground.

Connection: POWER INPUT (+) – Ground (–)

Does the battery voltage exist?

YES – Open circuit in SIGNAL line wire

NO – Open circuit in POWER INPUT line wire



5. Injector Signal Line Short Circuit Inspection

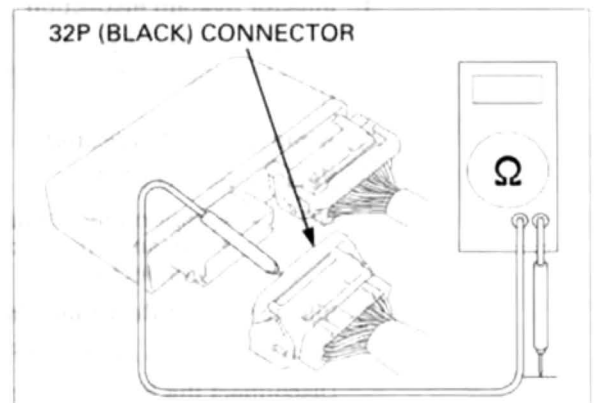
Check for continuity between the ECM connector terminal and ground.

Connection: SIGNAL AT ECM – Ground

Is there continuity?

YES – • Short circuit in the SIGNAL line wire
• Faulty injector

NO – Replace the ECM with a known good one, and recheck.



DTC 13-1 (No.2 INJECTOR)

See page 6-39

DTC 14-1 (No.3 INJECTOR)

See page 6-39

DTC 15-1 (No.4 INJECTOR)

See page 6-39

DTC 18-1 (CAM PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the cam pulse generator 2P (Natural) connector and recheck the DTC.

1. Cam Pulse Generator Peak Voltage Inspection

Turn the ignition switch OFF.

Disconnect the cam pulse generator 2P (Natural) connector.

Turn the ignition switch ON and engine stop switch RUN.

Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P (Natural) connector.

Connection: Gray (+) – White (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

YES – GO TO STEP 2.

NO – Faulty cam pulse generator

2. Cam Pulse Generator Circuit Inspection

Turn the ignition switch OFF.

Disconnect the cam pulse generator 2P (Natural) connector and the ECM connector.

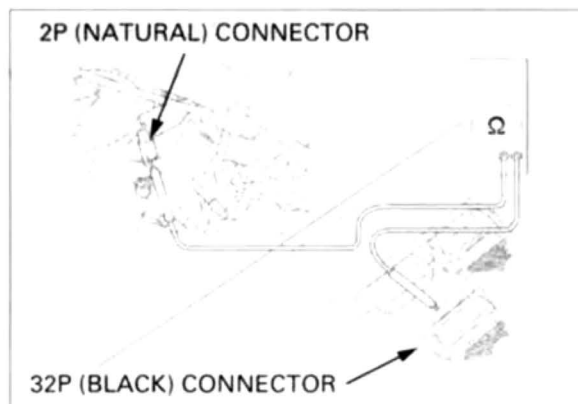
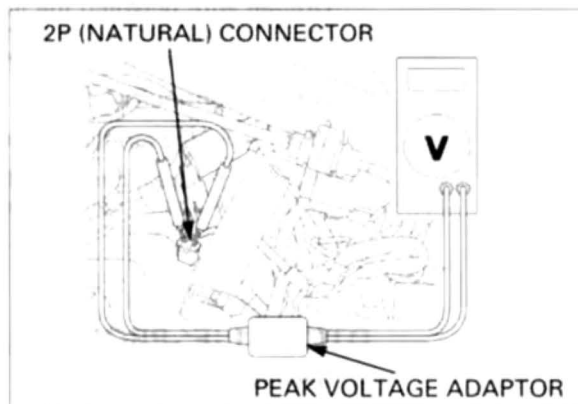
Check for continuity at the Grey and Green/Orange wire between the cam pulse generator 2P (Natural) connector terminals and the ECM 32P (Black) connector terminals.

Is there continuity?

YES – Faulty cam pulse generator

NO –

- Open circuit in the Green/Orange wire
- Open circuit in the Gray wire



DTC 19-1 (IGNITION PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the ignition pulse generator 2P (Red) connector and recheck the DTC.

1. Ignition Pulse Generator Peak Voltage Inspection

Disconnect the ignition pulse generator 2P (Red) connector.

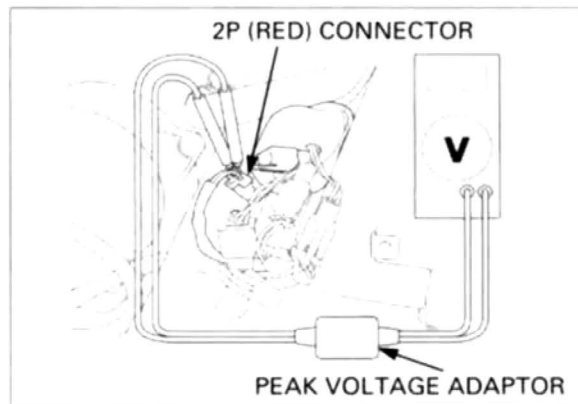
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P (Red) connector.

Connection: Yellow (+) – White/Yellow (–)

Is the voltage more than 0.7 V (20 °C/68 °F)?

YES – GO TO STEP 2.

NO – Faulty ignition pulse generator



2. Ignition Pulse Generator Circuit Inspection

Turn the ignition switch OFF.

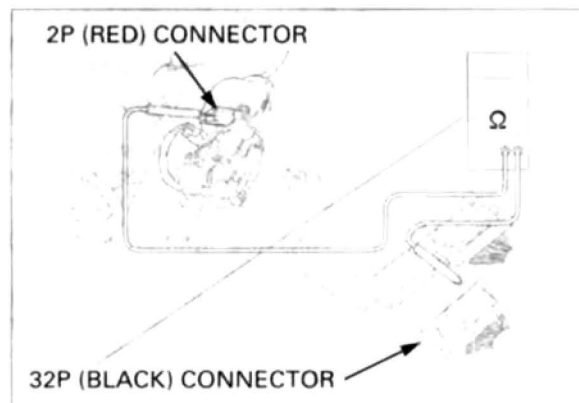
Disconnect the ignition pulse generator 2P (Red) connector and the ECM connector.

Check for continuity at the Yellow and Green/Orange wire between the ignition pulse generator 2P (Red) connector terminals and the ECM 32P (Black) connector terminals.

Is there continuity?

YES – Faulty ignition pulse generator

NO –
• Open circuit in the Yellow wire
• Open circuit in the Green/Orange wire



DTC 33-1 (E²-PROM)

1. Recheck DTC

Reset the ECM (page 6-9).

Turn the ignition switch ON and recheck the ECM E²-PROM.

Is the DTC 33-1 indicated?

YES – Replace the ECM with a new one, and recheck.

NO – Intermittent failure

FUEL LINE INSPECTION

FUEL PRESSURE INSPECTION

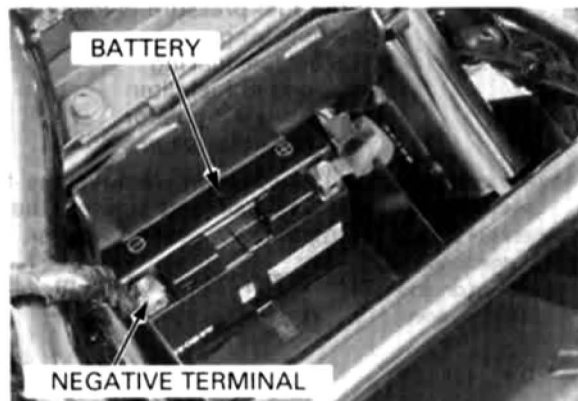
NOTICE

- Before disconnecting fuel tubes, release the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washers when the service check bolt is removed or loosened.

Remove the seat (page 3-4) and battery cover (page 16-5).

Unhook the battery cover retainers, then open the battery cover.

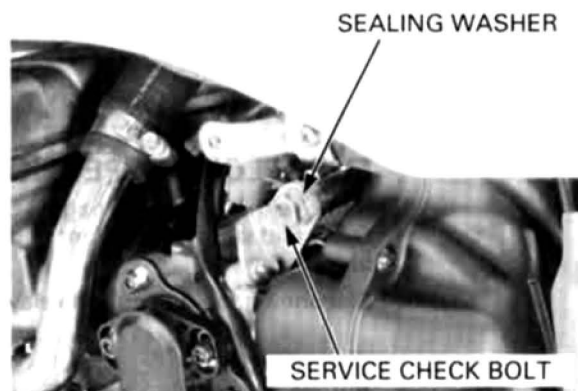
Disconnect the battery negative cable from the battery terminal.



Remove the left air cleaner side cover (page 3-5).

Cover the service check bolt with a rag or shop towel.

Slowly loosen the service check bolt and catch the remaining fuel using a approved gasoline container.



Remove the service check bolt and sealing washer, then attach the fuel pressure gauge.

TOOL:

Fuel pressure gauge

07406-0040003



FUEL SYSTEM (Programmed Fuel Injection)

Connect the battery negative cable.
Start the engine.
Read the fuel pressure at idle speed.

IDLE SPEED: $1,000 \pm 100 \text{ min}^{-1}$ (rpm)

STANDARD: 343 kPa (3.5 kgf/cm², 50 psi)

If the fuel pressure is higher than specified, inspect the following:

- Pressure regulator
- Fuel pump (page 6-45)

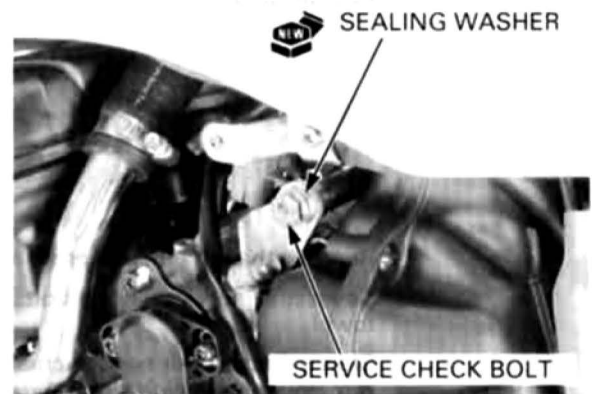
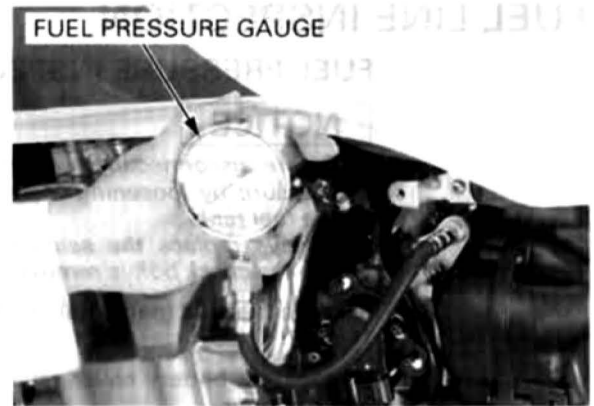
If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 6-45)

Always replace the sealing washer when the service check bolt is removed or loosened.

After inspection, remove the fuel pressure gauge and reinstall and tighten the service check bolt using the new sealing washer.

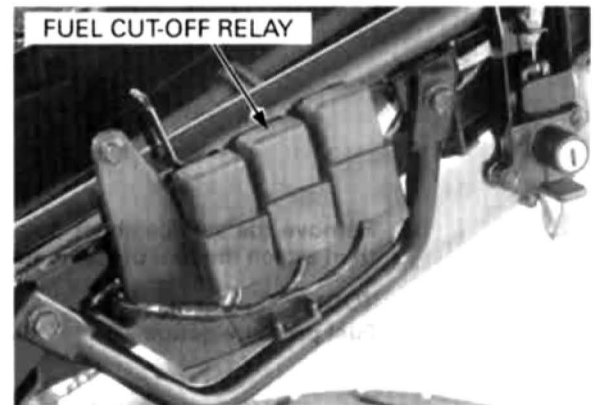
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



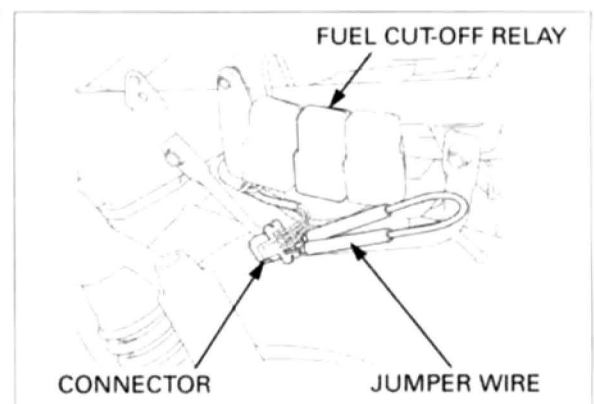
FUEL FLOW INSPECTION

Remove the rear cowl (page 3-5).
Open and support the front end of fuel tank (page 4-5).

Disconnect the fuel cut-off relay connector.



Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.



Remove the service check bolt.

Place a measuring cup or equivalent to the service check bolt hole.

Turn the ignition switch ON for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:

**188 cm³ (6.4 US oz, 6.6 Imp oz) minimum
/10 seconds at 12 V**

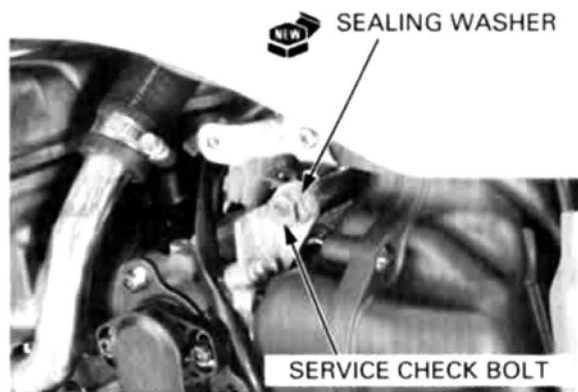
If the fuel flow is less than specified, inspect the following:

- Pinched or clogged fuel hose
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 6-45)

After inspection, install the service check bolt with the new sealing washer, tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)

Start the engine and check for leak.



FUEL PUMP

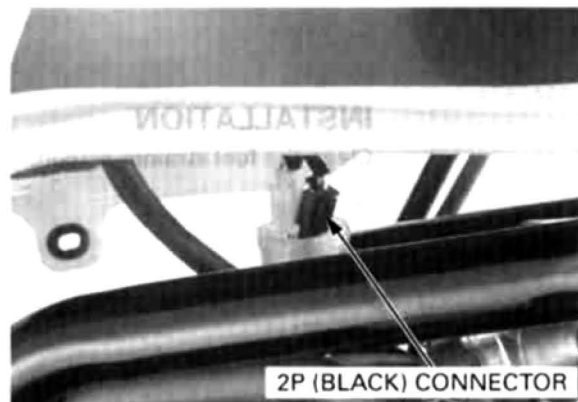
INSPECTION

Turn the ignition switch ON and confirm that the fuel pump operates for a few seconds.

If the fuel pump does not operate, inspect as follows:

Open and support the front end of fuel tank (page 4-5).

Disconnect the fuel pump 2P (Black) connector.



Turn the ignition switch ON and measure the voltage between the terminals.

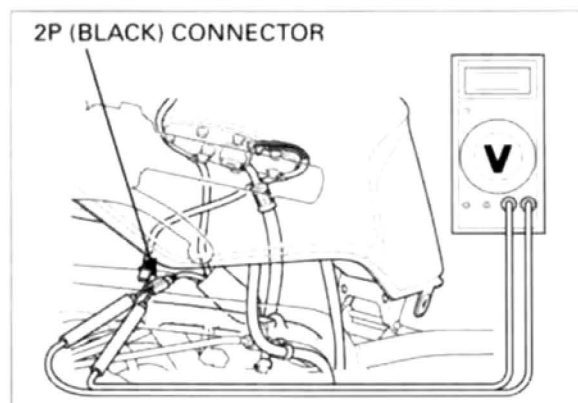
Connection: Brown (+) – Green (–)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

If there is no battery voltage, inspect the following:

- Main fuse 30A
- Sub fuse 10A
- Engine stop switch (page 19-24)
- Fuel cut relay (page 6-47)
- Engine stop relay (page 6-82)
- Bank angle sensor (page 6-81)
- ECM (page 6-83)



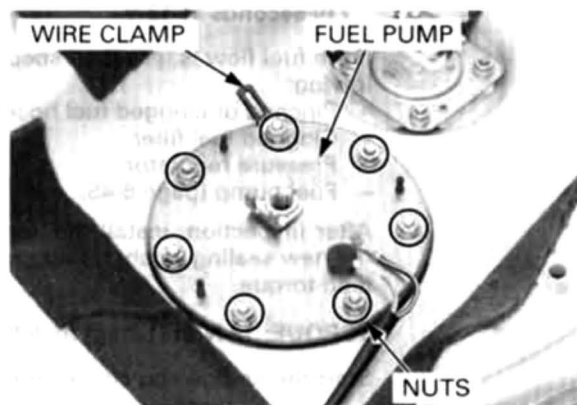
REMOVAL

NOTICE

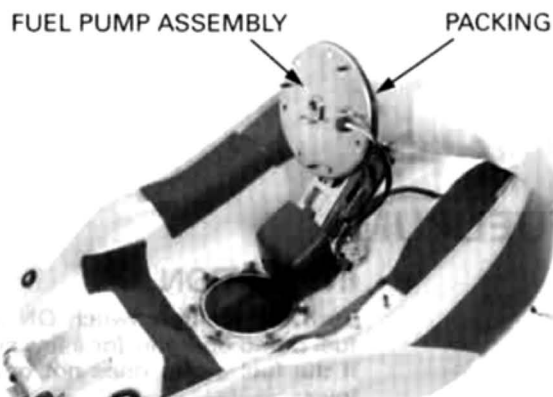
- Before disconnecting the fuel tube, release the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washers when the service check bolt is removed or loosened.

Remove the fuel tank (page 6-48).

Remove the fuel pump mounting nuts and wire clamp.

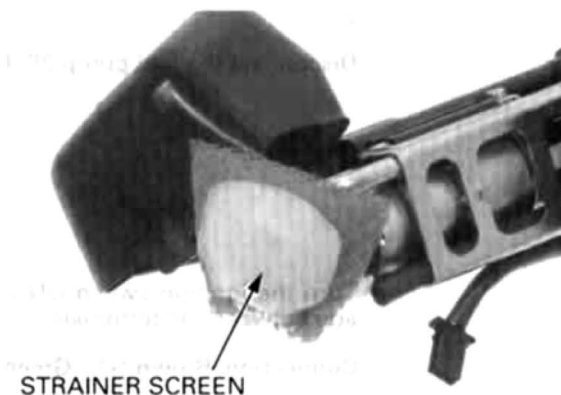


Remove the fuel pump assembly and packing.



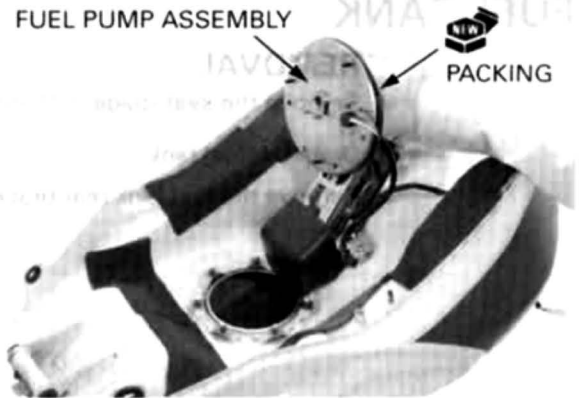
INSTALLATION

Clean the fuel strainer screen.



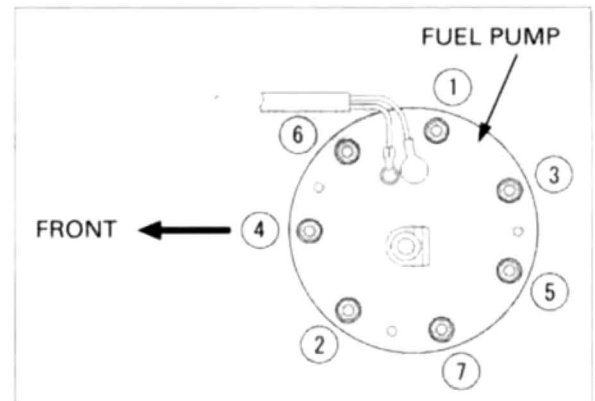
Always replace packing with a new one.

Place a new packing onto the fuel pump.
Install the fuel pump being careful not to damage the fuel pump wire.



Install the wire clamp and fuel pump mounting nuts.
Tighten the fuel pump mounting nuts in the sequence shown.

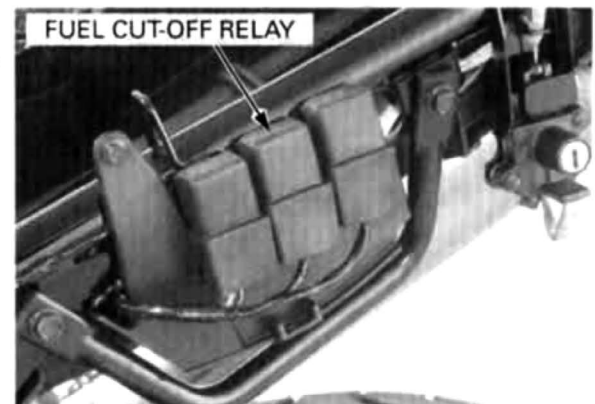
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



FUEL CUT-OFF RELAY

INSPECTION

Remove the rear cowl (page 3-5).
Disconnect the fuel cut-off relay 4P connector, remove the fuel cut-off relay.



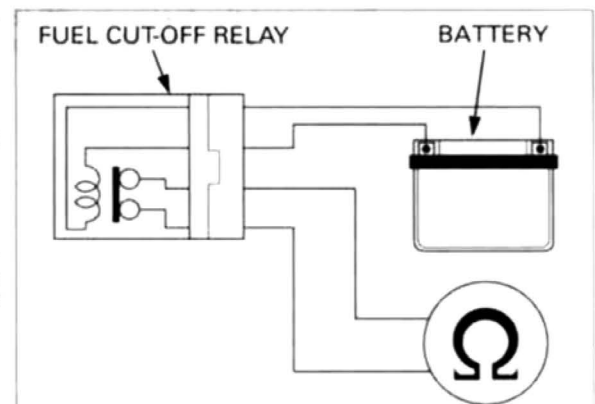
Connect the ohmmeter to the fuel cut-off relay connector terminals.

Connection: Black/White – Brown

Connect the 12V battery to the following fuel cut relay connector terminals.

Connection: Brown/Black – Black/White

There should be continuity only when the 12V battery is connected. If there is no continuity when the 12V battery is connected, replace the fuel cut-off relay.



FUEL TANK

REMOVAL

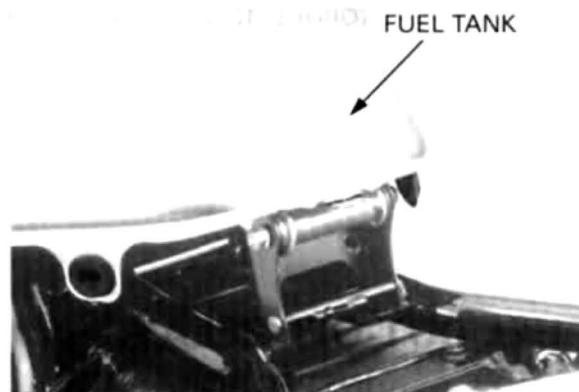
Remove the seat (page 3-4) and side cover (page 3-4).

Drain the fuel tank.

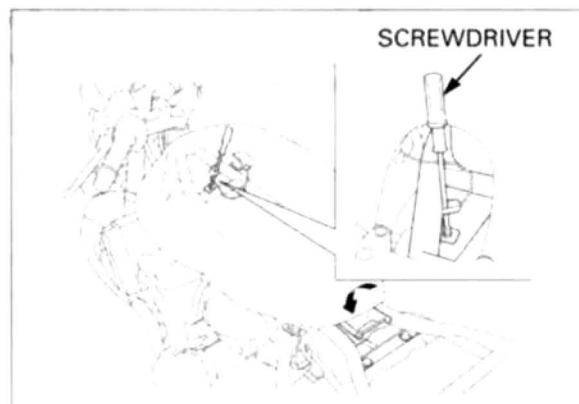
Remove the fuel tank rear bracket socket bolts.



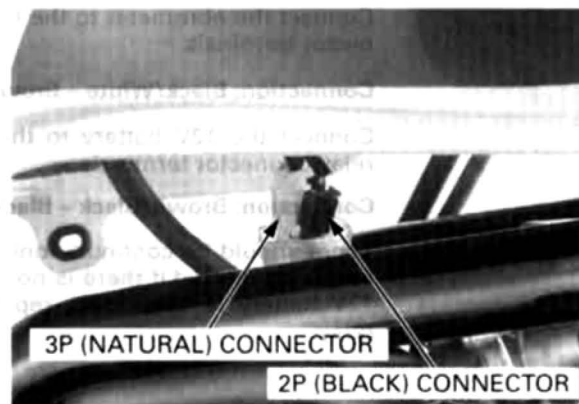
Pull up the rear end of the fuel tank and release the tank from the cushion rubbers on the frame.



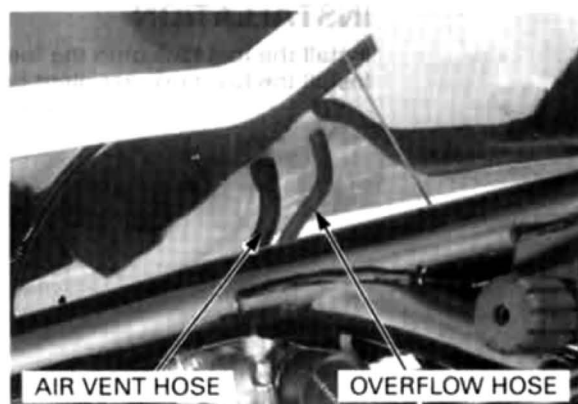
Open and support the front end of fuel tank using a equipped screwdriver as shown.



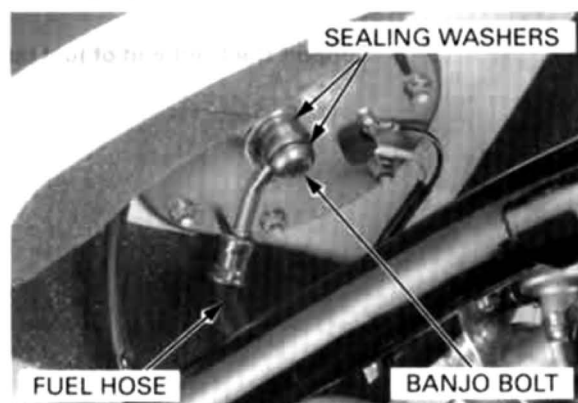
Disconnect the fuel pump 2P (Black) connector and fuel level sensor 3P (Natural) connector.



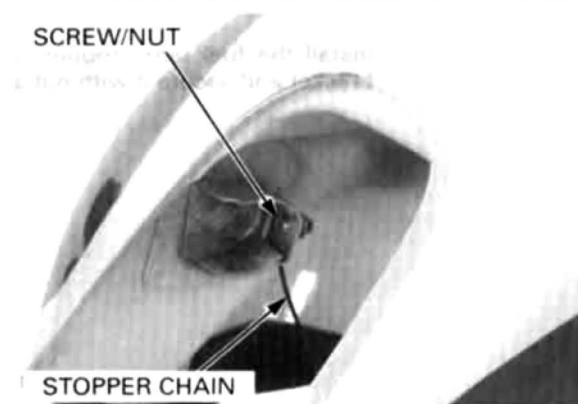
Disconnect the fuel tank air vent hose and overflow hose.



Remove the fuel hose banjo bolt, sealing washers, and the fuel hose.



Remove the screw and nut, then remove the fuel tank stopper chain from the fuel tank bracket.

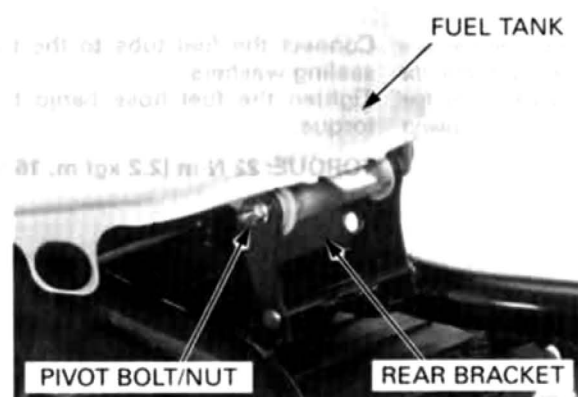


Remove the support tools and lower the fuel tank. Remove the fuel tank rear pivot bolt and nut, and then remove the fuel tank.

NOTICE

Be careful not to damage the fuel tank.

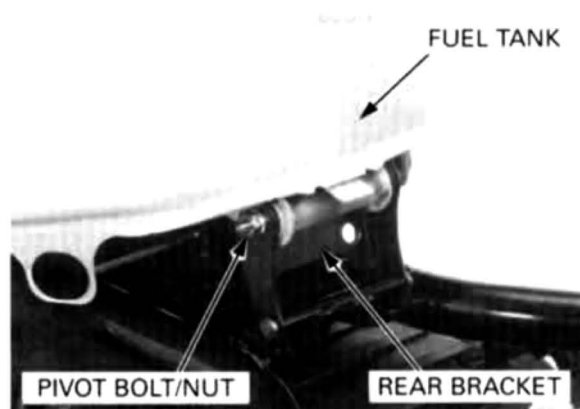
Refer to procedures for fuel pump removal (page 6-46).



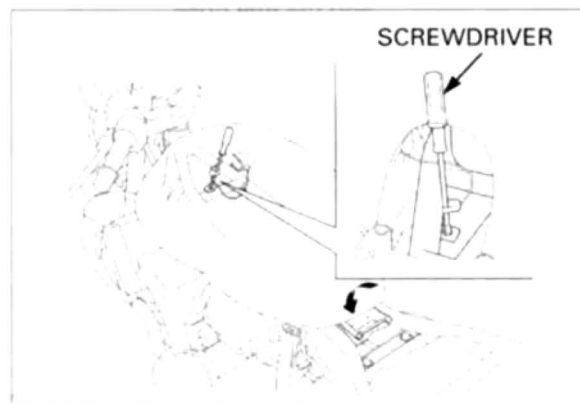
FUEL SYSTEM (Programmed Fuel Injection)

INSTALLATION

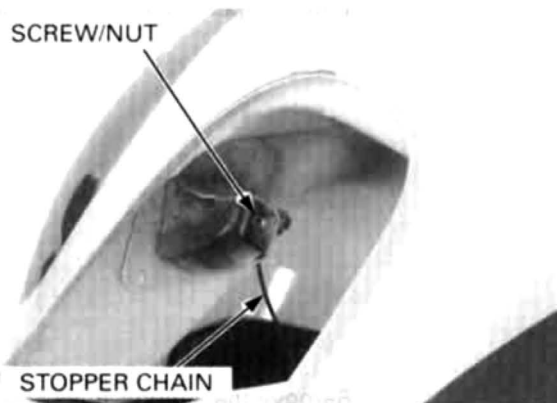
Install the fuel tank onto the fuel tank rear bracket.
Install the fuel tank rear pivot bolt and nut.



Support the front end of fuel tank.



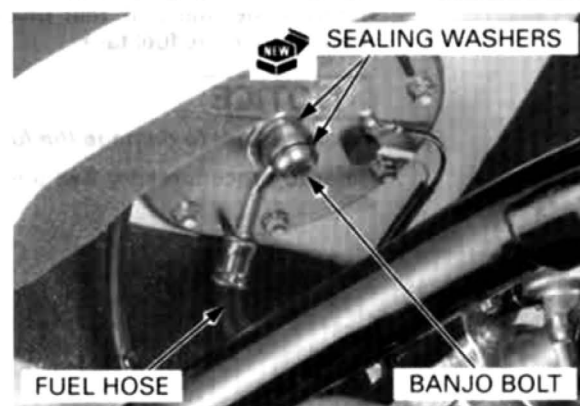
Install the fuel tank stopper chain to the fuel tank bracket and secure it with nut and screw.



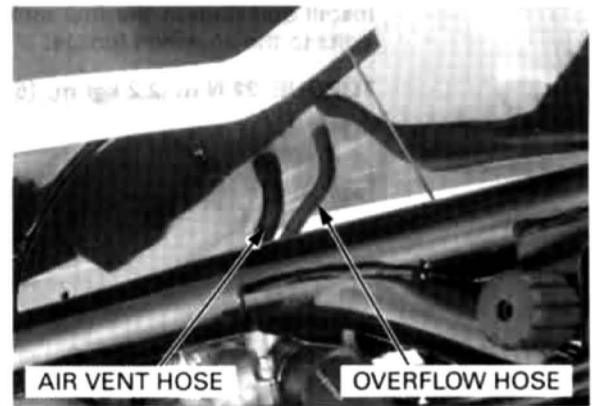
Align the fuel tube eyelet joint with the stopper on the fuel pump.

Connect the fuel tube to the fuel pump with new sealing washers.
Tighten the fuel hose banjo bolt to the specified torque.

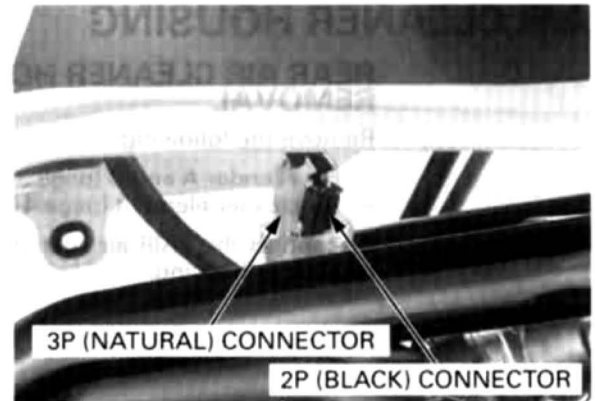
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



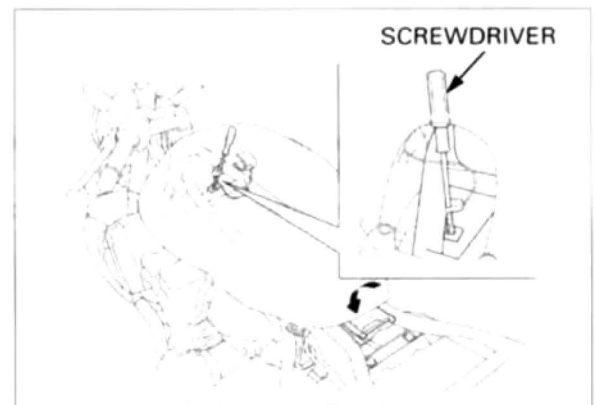
Connect the fuel tank air vent hose and overflow hose to the fuel tank.



Connect the fuel pump 2P (Black) connector and fuel level sensor 3P (Natural) connector.

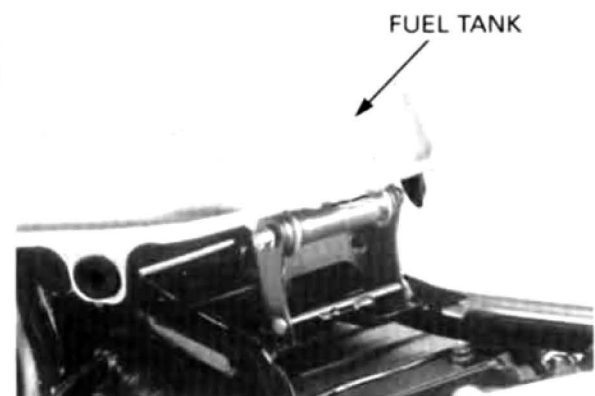


Remove the supporting tool and close the fuel tank.



Pull up the rear end of the fuel tank.

Press the tank forward and install the cushion rubbers on the frame into the hooks inside the fuel tank.



FUEL SYSTEM (Programmed Fuel Injection)

Install and tighten the fuel tank rear bracket socket bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



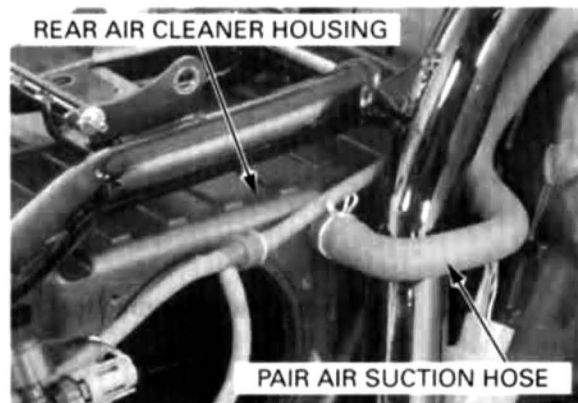
AIR CLEANER HOUSING

REAR AIR CLEANER HOUSING REMOVAL

Remove the following:

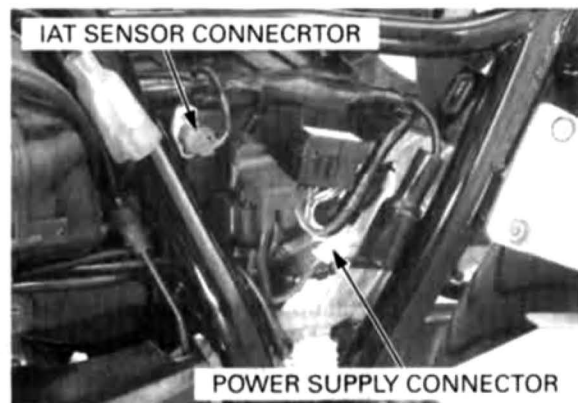
- Rear fender A and B (page 3-8)
- Air cleaner element (page 4-7)

Disconnect the PAIR air suction hose from the rear air cleaner housing.

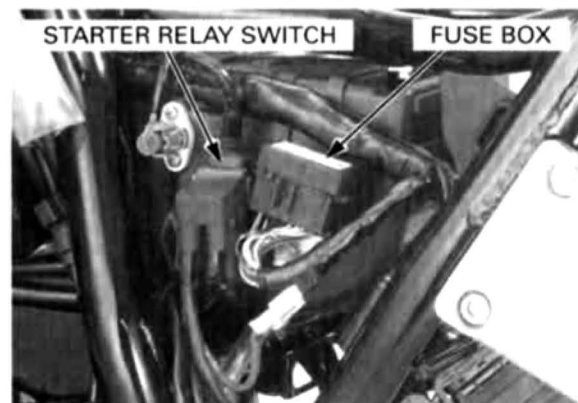


Disconnect the IAT sensor connector from the sensor.

Disconnect the power supply connector.

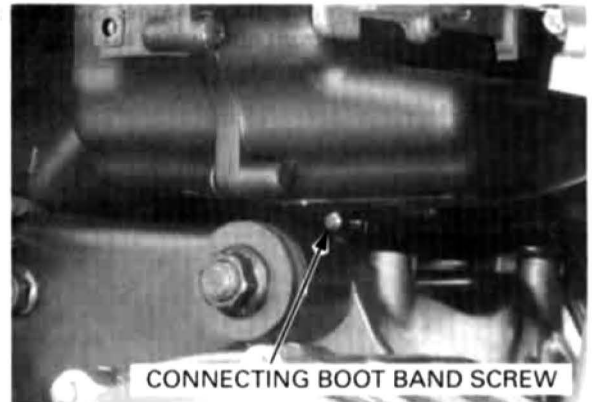


Remove the starter relay switch and fuse box from the rear air cleaner housing.

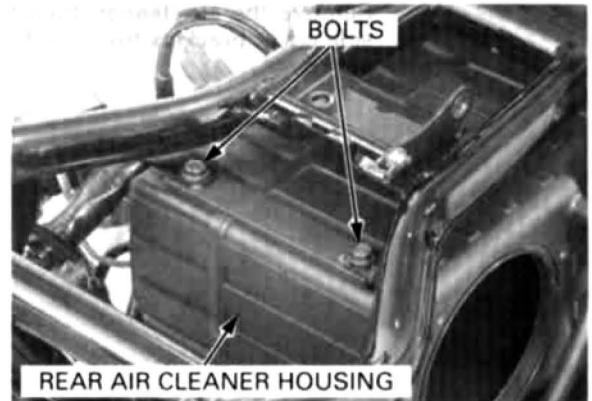


Loosen the air cleaner case connecting boot band screw.

Remove the air cleaner housing.



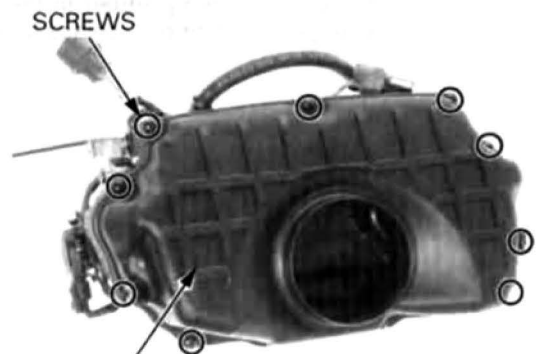
Remove the rear air cleaner housing mounting bolts and rear air cleaner housing.



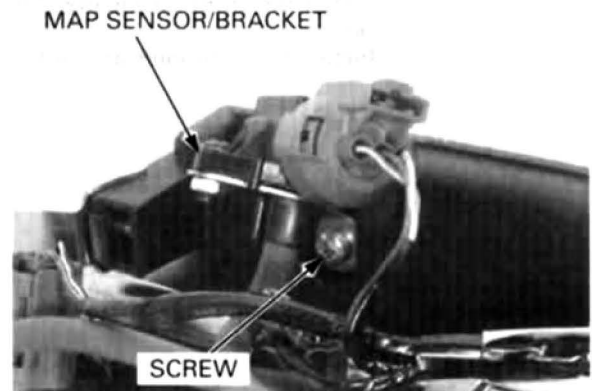
FRONT AIR CLEANER HOUSING REMOVAL

Remove the throttle body/front air cleaner housing assembly (page 6-57).

Remove the screws and front air cleaner housing cover.

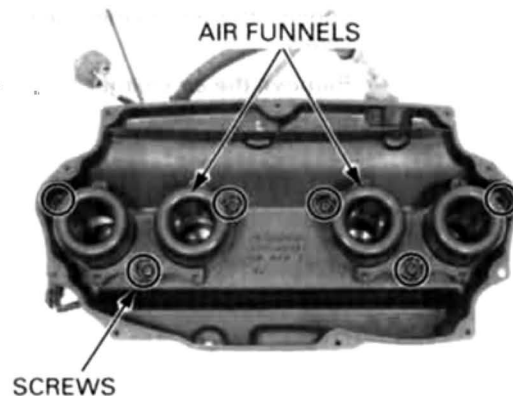


Remove the screw and MAP sensor bracket from the front air cleaner housing.

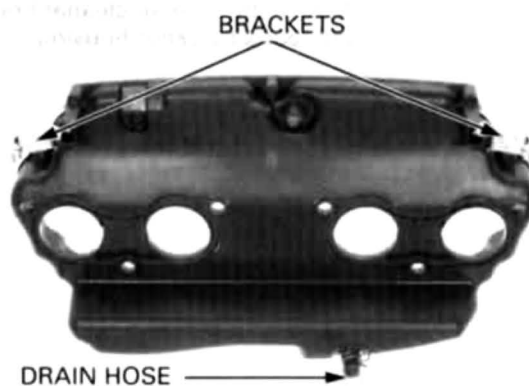


FUEL SYSTEM (Programmed Fuel Injection)

Remove the air funnel mounting screws, air funnels and front air cleaner housing.



Remove the air cleaner drain hose and air cleaner side cover brackets from the front air cleaner housing cover.

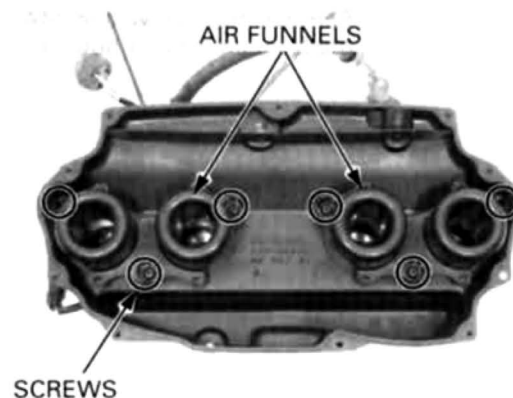


FRONT AIR CLEANER HOUSING INSTALLATION

Check the sealing rubber in the air cleaner housing is in good condition, replace if necessary.



Install the front air cleaner housing to the throttle body.
Install the air funnels and tighten the screws.



Install the MAP sensor bracket onto the front air cleaner housing, tighten the screw.

MAP SENSOR/BRACKET



Install the front air cleaner housing cover and tighten the screws.

Install the throttle body/front air cleaner housing assembly (page 6-63).

SCREWS



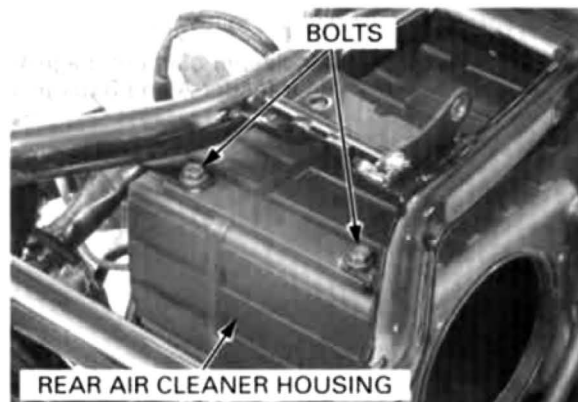
REAR AIR CLEANER HOUSING INSTALLATION

Install the connecting tube band to the rear air cleaner housing connecting tube.

Install the rear air cleaner housing into the frame.

Install and tighten the rear air cleaner housing mounting bolts.

BOLTS



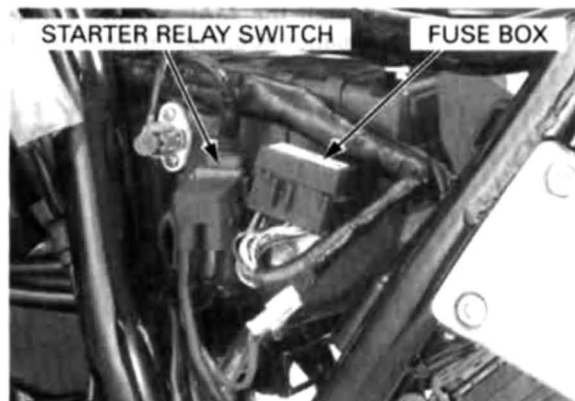
Tighten the connecting boot band screw.

CONNECTING BOOT BAND SCREW

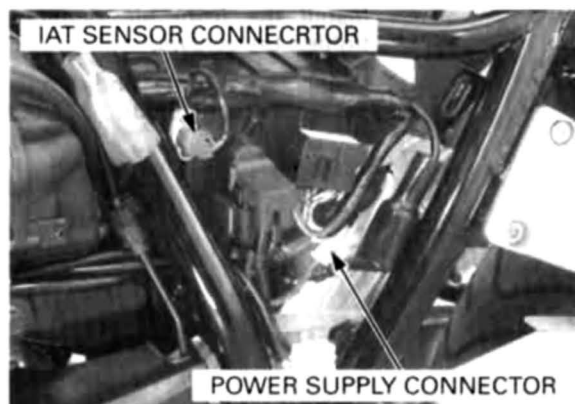


FUEL SYSTEM (Programmed Fuel Injection)

Install the fuse box and starter relay switch to the rear air cleaner housing.



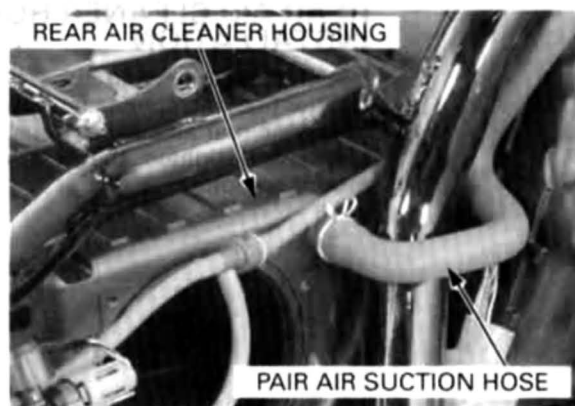
Connect the power supply connector and IAT sensor connector.



Connect the PAIR air suction hose to the rear air cleaner housing.

Install the following:

- Air cleaner element (page 4-7)
- Rear fender A and B (page 3-10)



THROTTLE BODY

REMOVAL

NOTICE

- Before disconnecting the fuel tube, release the fuel pressure by loosening the service check bolt.
- Always replace the sealing washer when the service check bolt is removed or loosened.

Remove the following:

- Fuel tank (page 6-48)
- Rear air cleaner housing (page 6-52)

Be careful not to damage the main wire harness.

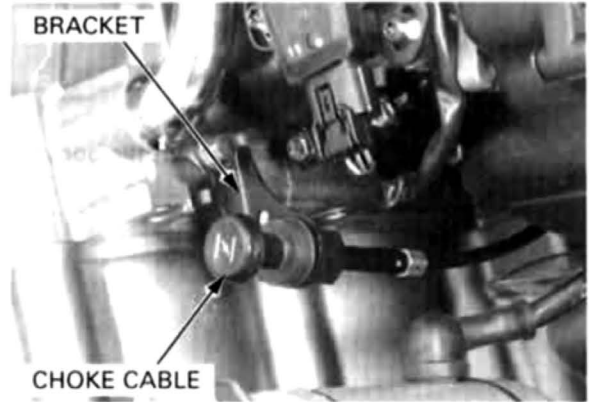
Remove the main wire harness between the front air cleaner housing and frame.

MAIN WIRE HARNESS



Disconnect the choke cable from the cable bracket.

BRACKET



CHOKE CABLE

Disconnect the crankcase breather hose.

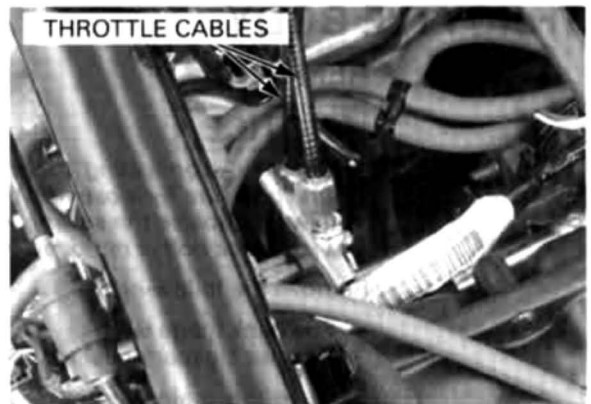
CRANKCASE BREATHER HOSE



FUEL SYSTEM (Programmed Fuel Injection)

Do not snap the throttle valve from full open to dull close after the throttle cable has been removed. It may cause incorrect idle operation.

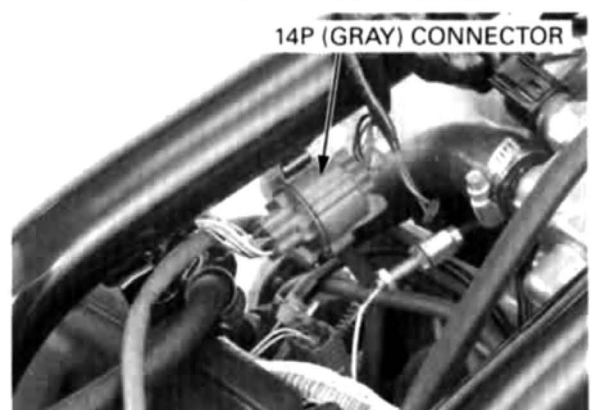
Disconnect the throttle cable ends from the throttle drum.



Disconnect the cam pulse generator 2P (Natural) connector.



Disconnect the throttle body sub-harness 14P (Gray) connector.



Loosen the throttle body side insulator band screws.

Remove the throttle body/front air cleaner housing as an assembly.

NOTICE

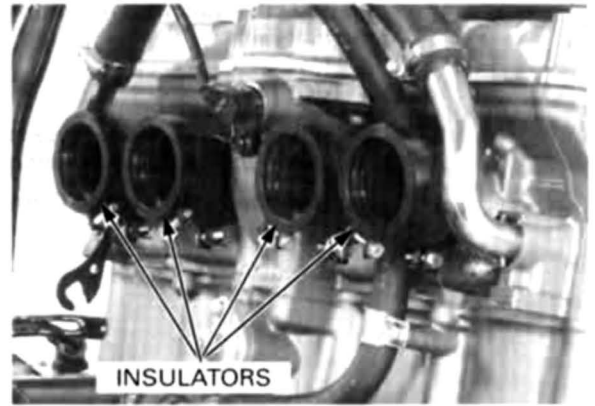
Do not hold the fuel rail on the throttle body while removing the throttle body.



Loosen the engine side insulator band screws and remove the insulators from the cylinder head.

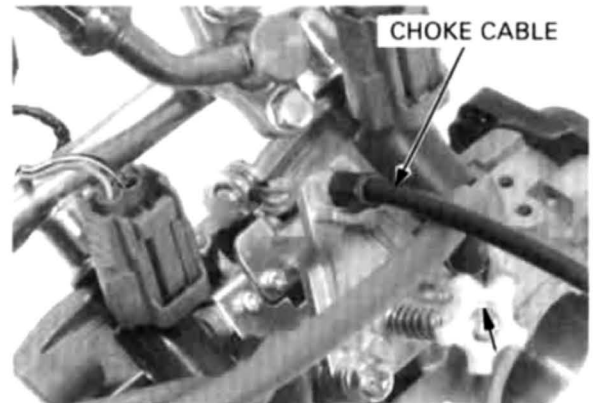
NOTICE

Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.



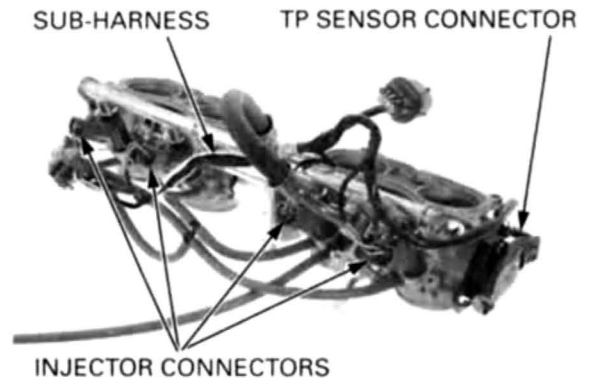
Remove the front air cleaner housing from the throttle body (page 6-53).

Remove the choke cable from the choke/throttle stop screw bracket.



Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.

Disconnect the injector connectors and TP sensor connector, then remove the throttle body sub-harness.



Disconnect the vacuum hoses.



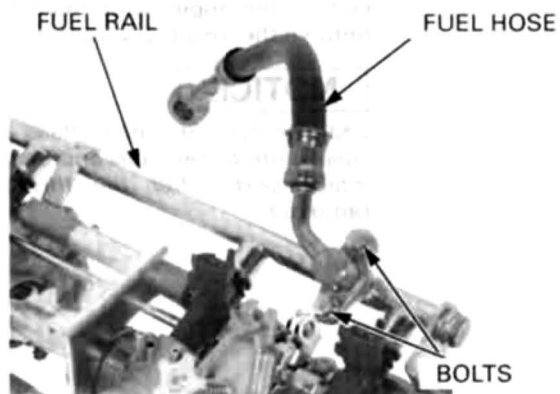
FUEL SYSTEM (Programmed Fuel Injection)

Remove the fuel hose mounting bolts while holding the fuel rail.

NOTICE

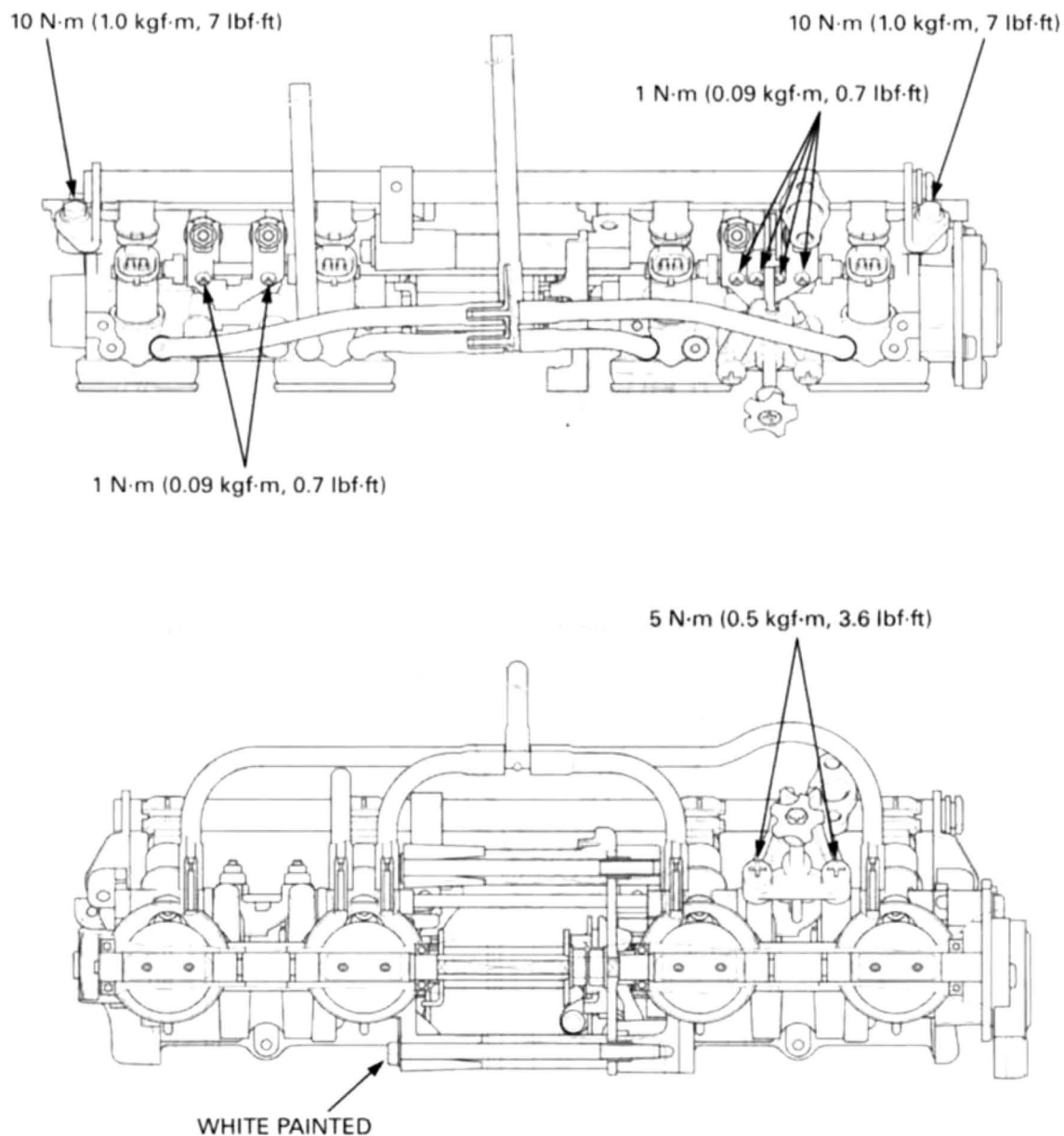
Do not apply excessive force to the fuel rail while removing the fuel pipe mounting bolts.

Remove the fuel hose and O-ring from the fuel rail.

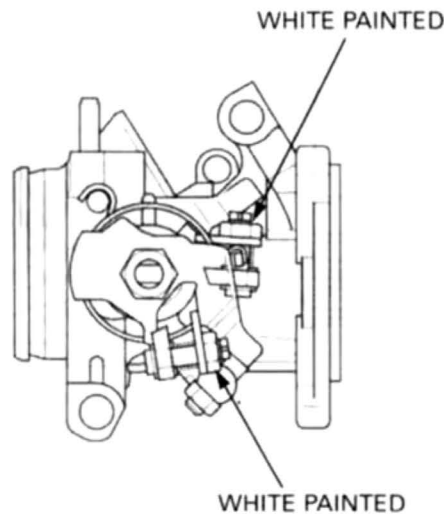


NOTICE

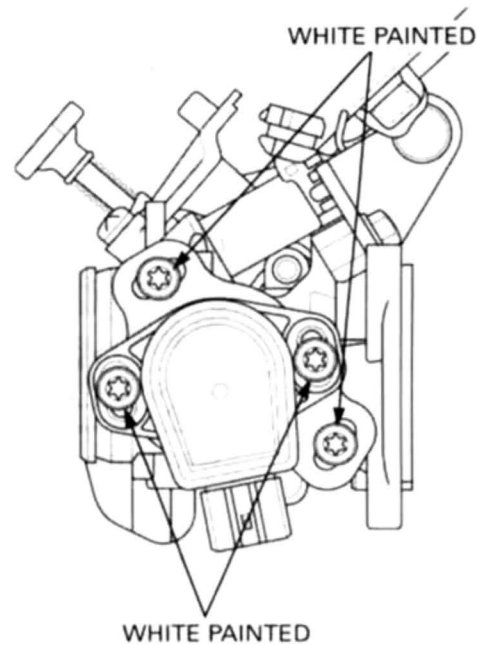
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.



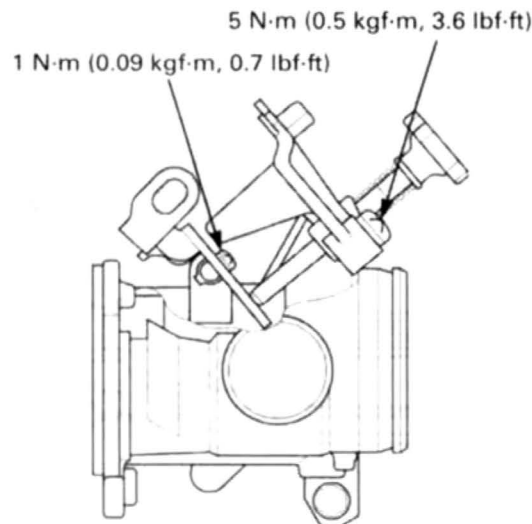
No. 3/4 THROTTLE LINK:



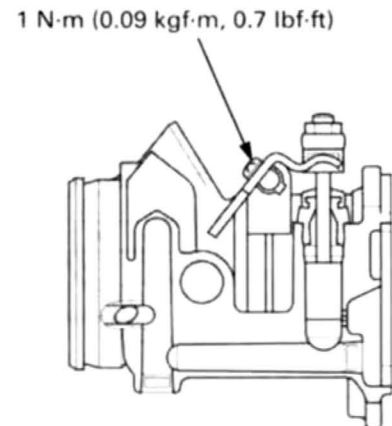
THROTTLE SENSOR:



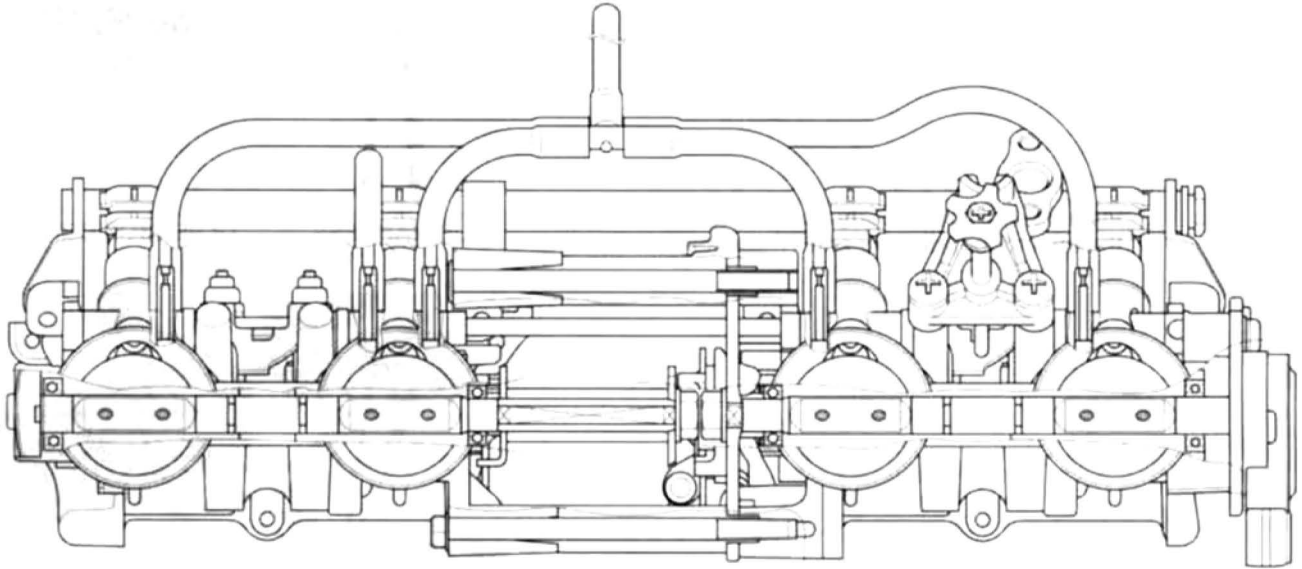
THROTTLE STOP SCREW BRACKET:



No. 1/2 STARTER VALVE LINK:



THROTTLE BODY VACUUM HOSE ROUTING

**INSTALLATION**

Apply oil to a new O-ring and install it into the groove of the fuel hose joint.

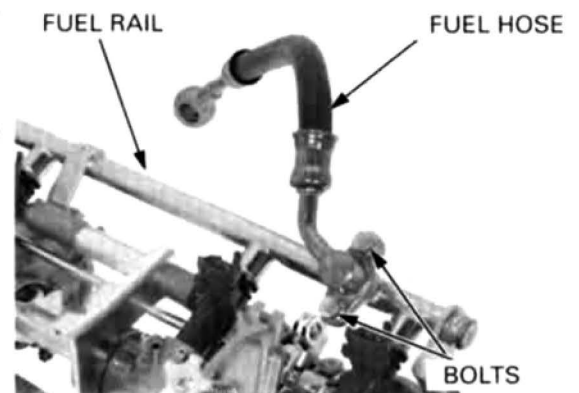
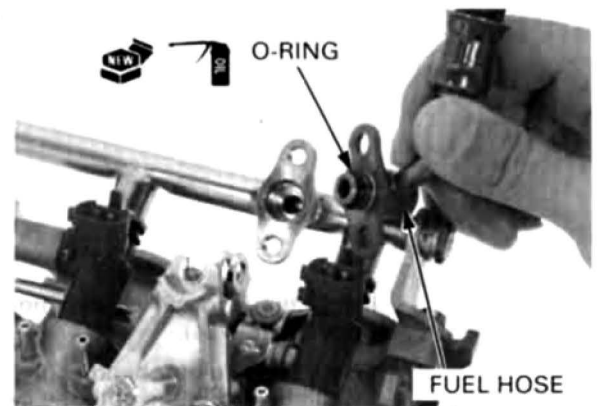
Install the fuel hose to the fuel rail.

Install and tighten the fuel hose mounting bolts while holding the fuel rail.

NOTICE

Do not apply excessive force to the fuel rail while tightening the fuel pipe mounting bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

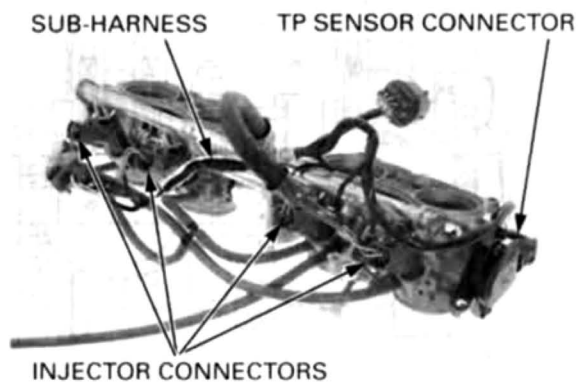


FUEL SYSTEM (Programmed Fuel Injection)

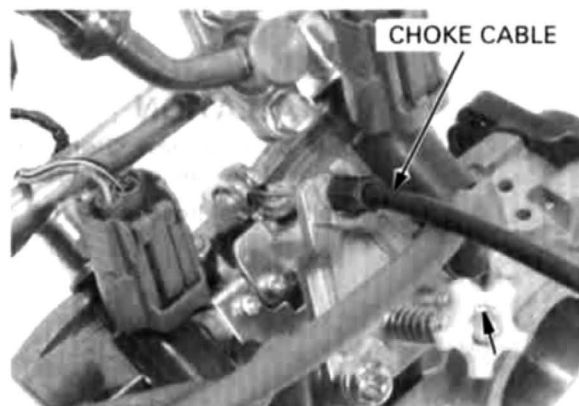
Connect the vacuum hoses to the throttle body.



Install the throttle body sub-harness and connect the injector connectors and TP sensor connector.

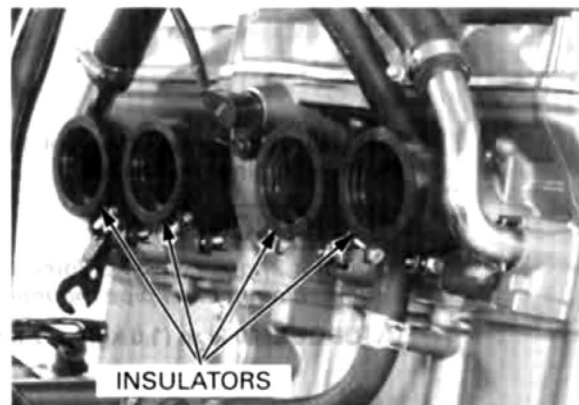


Hook the choke cable end to the choke cable link bracket.
Install the choke cable to the choke cable/throttle stop screw bracket.

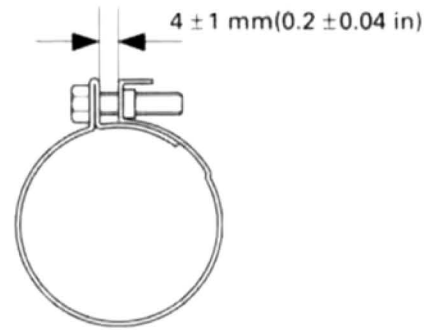


Install the front air cleaner housing to the throttle body (page 6-54).

Check the insulator band angle.
Install the insulators onto the cylinder head.



Tighten the cylinder head side insulator band so that the insulator band distance is 4 ± 1 mm (0.2 ± 0.04 in).

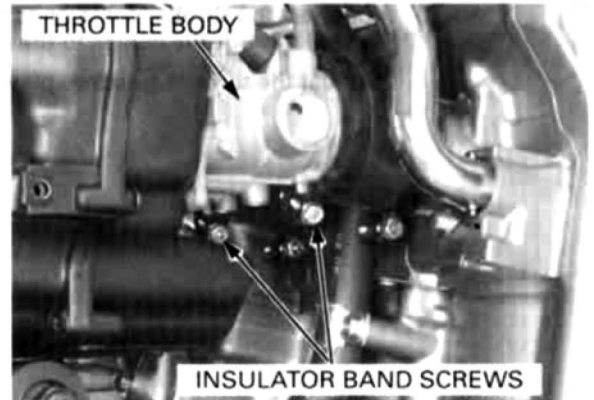


Apply oil to the insulator inside surfaces for ease of throttle body installation.

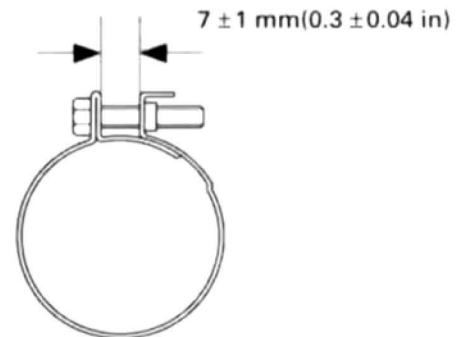
Place the throttle body/front air cleaner housing assembly into the frame, then install the throttle body into the insulators.

NOTICE

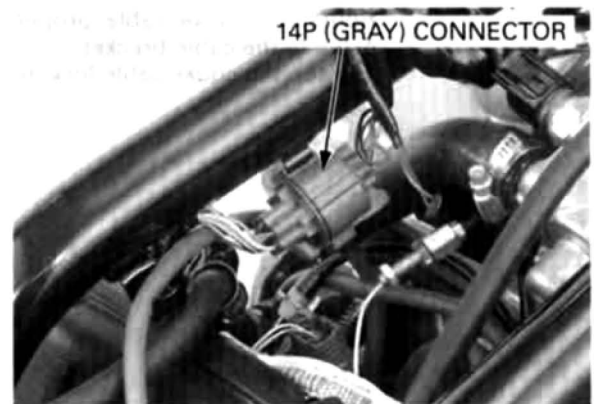
Do not hold the fuel pipe on the throttle body while installing the throttle body.



Tighten the throttle body side insulator band so that the insulator band distance is 7 ± 1 mm (0.3 ± 0.04 in).



Route the injector sub-harness referring the cable and harness routing (page 1-23). Connect the throttle body sub-harness 14P (Gray) connector.



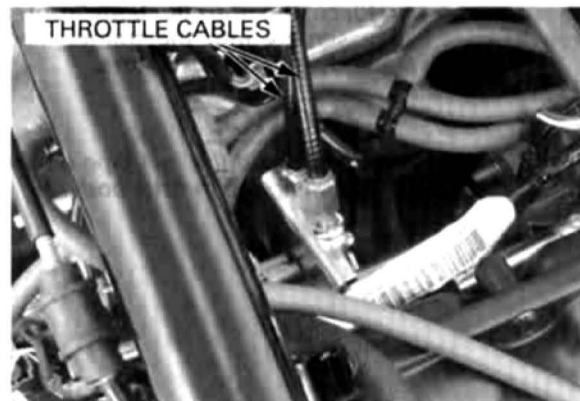
FUEL SYSTEM (Programmed Fuel Injection)

Connect the cam pulse generator 2P (Natural) connector.



Connect the throttle cable ends to the throttle drum. Install the throttle cables to the guide bracket.

Adjust the throttle grip free play (page 4-6).

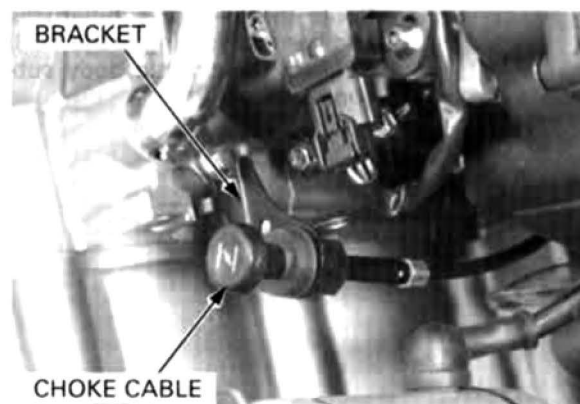


Connect the crankcase breather hose to the cylinder head cover and front air cleaner housing, secure it with hose clips.



Route the choke cable properly, install the choke cable to the cable bracket.

Tighten the choke cable lock nut securely



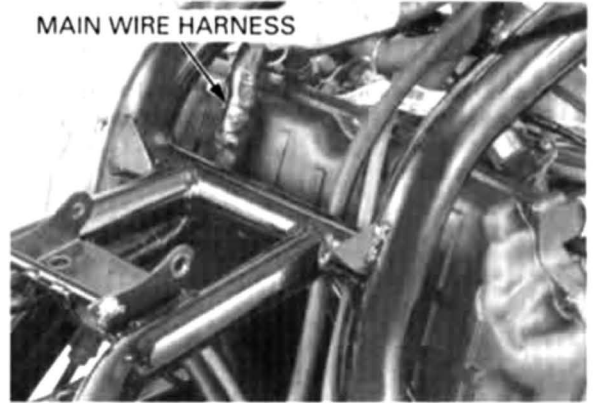
Be careful not to damage the main wire harness

Route the main wire harness between the front air cleaner housing and frame.

Install the following:

- Rear air cleaner housing (page 6-52)
- Fuel tank (page 6-50)

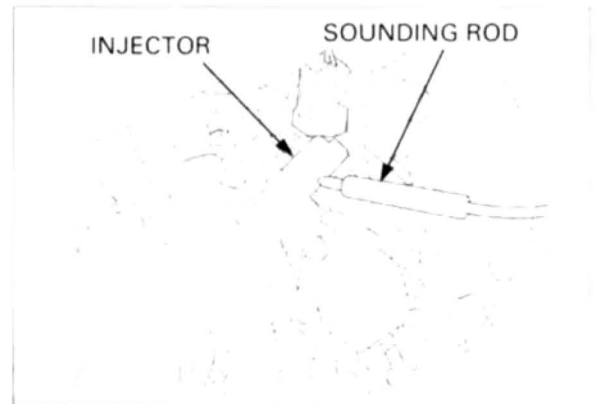
MAIN WIRE HARNESS



INJECTOR

INSPECTION

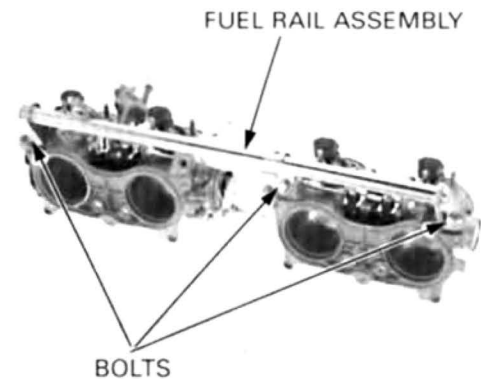
Start the engine and let it idle.
Confirm the injector operating sounds with a sounding rod or stethoscope.



REMOVAL

Remove the throttle body (page 6-57).

Remove the bolts and fuel pipe assembly.



Remove the injectors from the fuel pipe.

Remove the seal ring, O-ring and cushion ring.

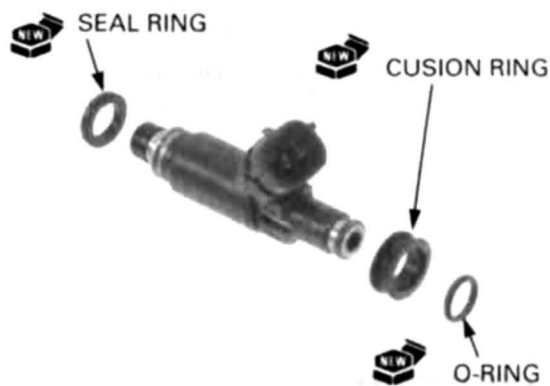


INSTALLATION

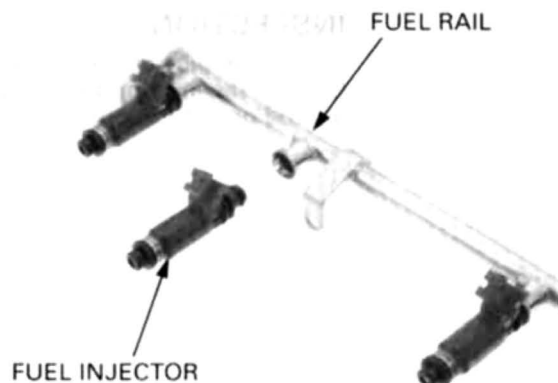
Apply oil to the new O-ring.

Replace the seal ring, cushion ring and O-ring with new ones as a set.

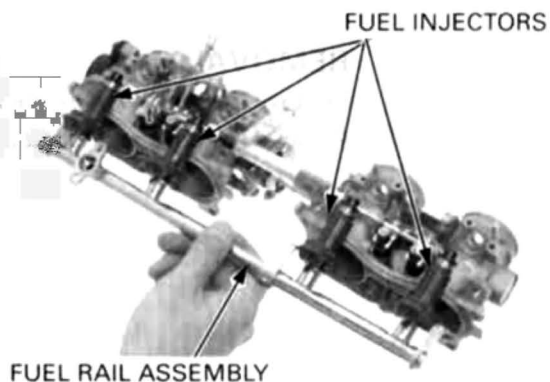
Install the new seal ring, cushion ring and O-ring, being careful not to damage the O-ring.



Install the fuel injectors into the fuel rail, being careful not to damage the O-ring and cushion ring.



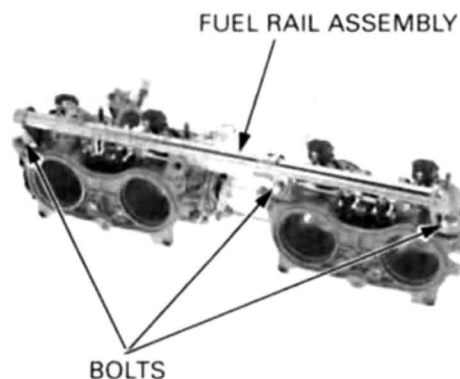
Install the fuel rail assembly onto the throttle body, being careful not to damage the seal rings.



Install and tighten the fuel rail mounting bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the throttle body (page 6-63).

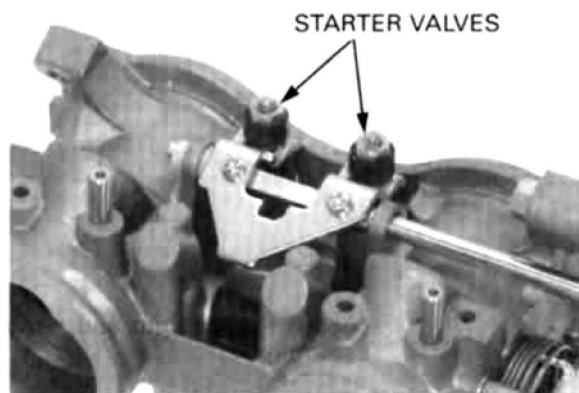


STARTER VALVE

DISASSEMBLY

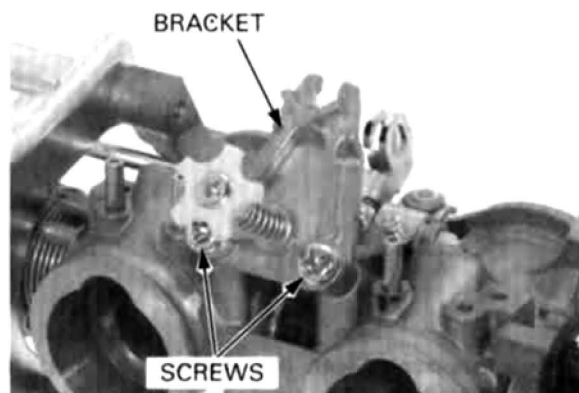
Remove the fuel rail and injectors (page 6-67).

Turn each starter valve adjusting screw in, counting number of turns until it seats lightly.
Record the number of turns.



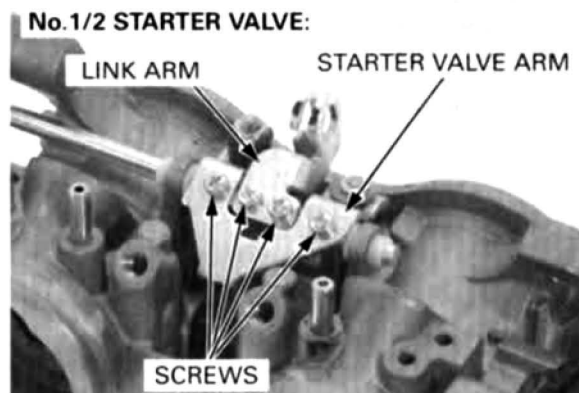
No.1/2 starter valve:

Remove the screws and choke cable/throttle stop screw bracket from the throttle body.



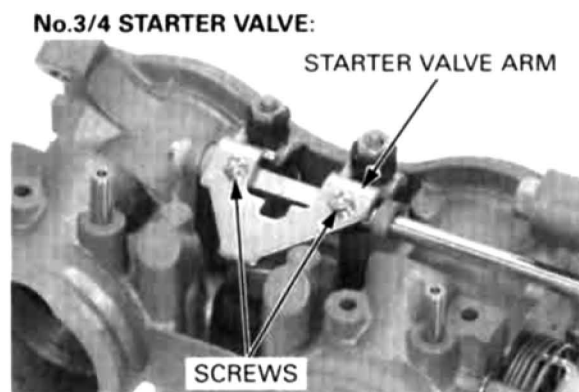
Remove the starter valve arm screws and starter valve arms.

Remove the screw and choke cable link arm.



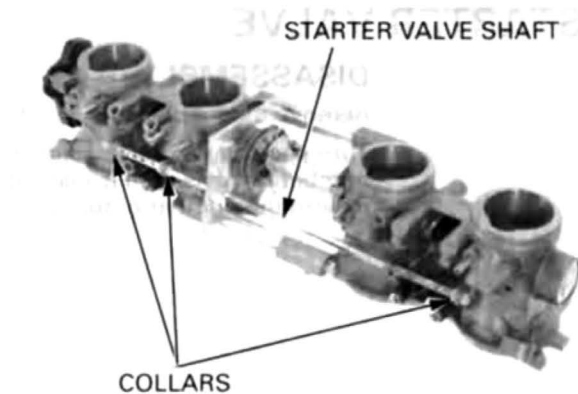
No.3/4 starter valve:

Remove the starter valve arm screws and starter valve arm.

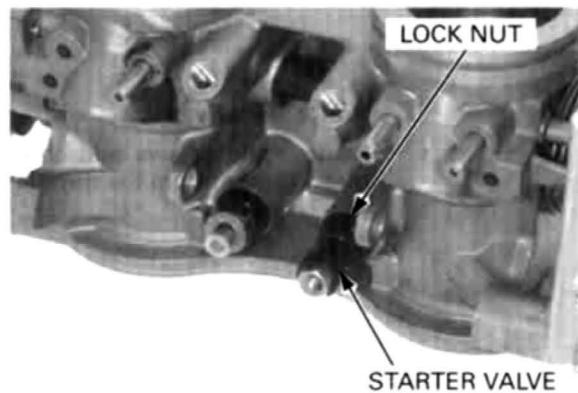


FUEL SYSTEM (Programmed Fuel Injection)

Remove the starter valve shaft and three collars.



Loosen the lock nut and remove the starter valve assembly.

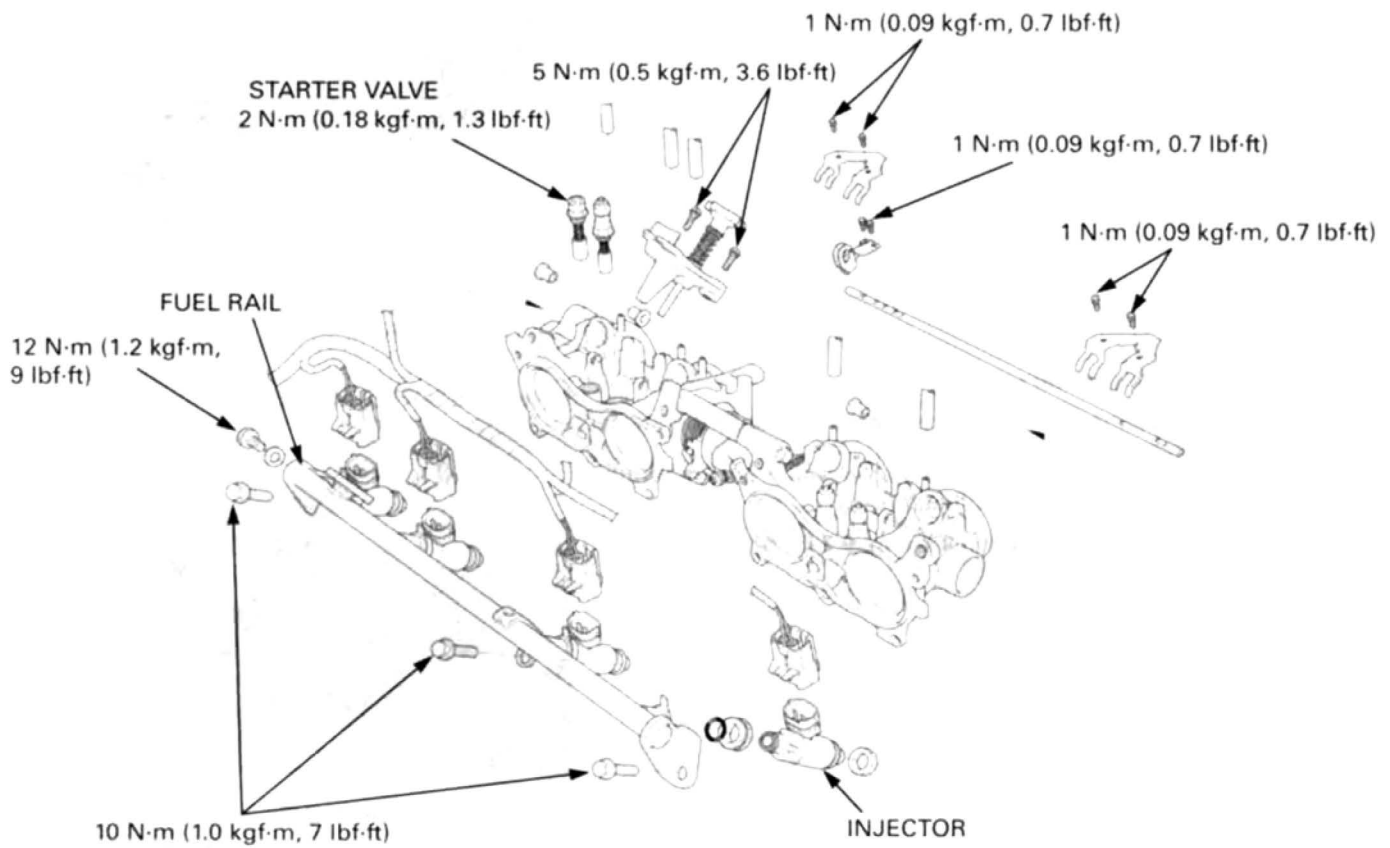


Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.

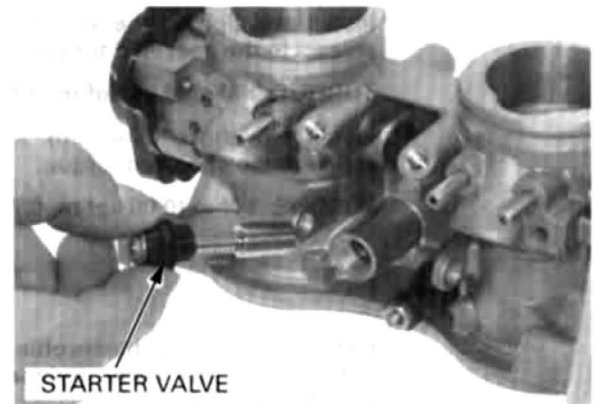
Clean the starter valve bypass using compressed air.



ASSEMBLY

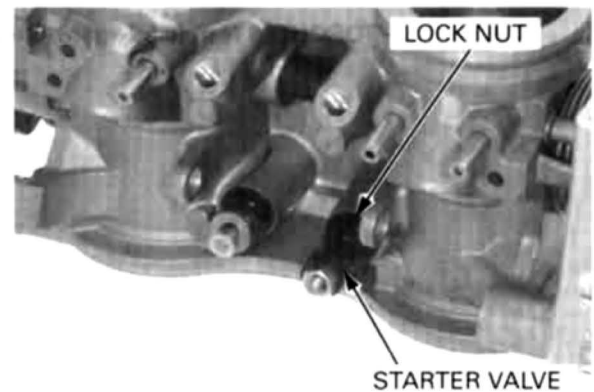


Install the starter valve assembly into the valve hole.



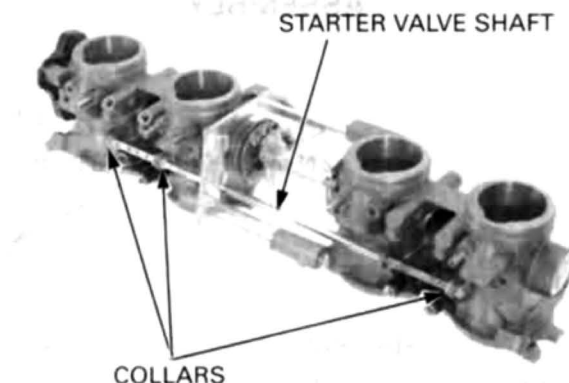
Tighten the starter valve lock nut to the specified torque.

TORQUE: 2 N·m (0.18 kgf·m, 1.3 lbf·ft)



FUEL SYSTEM (Programmed Fuel Injection)

Install the three collars and starter valve shaft.



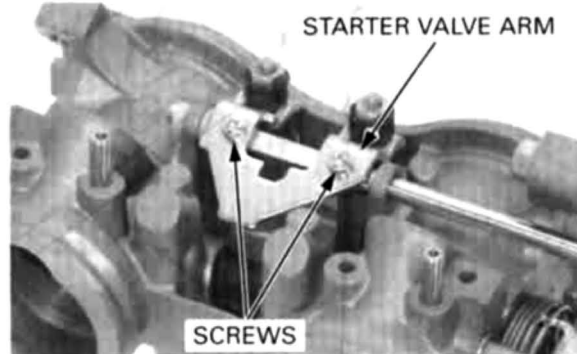
No.3/4 starter valve:

Install the No.3/4 starter valve arm onto the starter valves.

Install and tighten the starter valve arm mounting screws to the specified torque.

TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)

No.3/4 STARTER VALVE:



No.1/2 starter valve:

Install the No.1/2 starter valve arm to the starter valves.

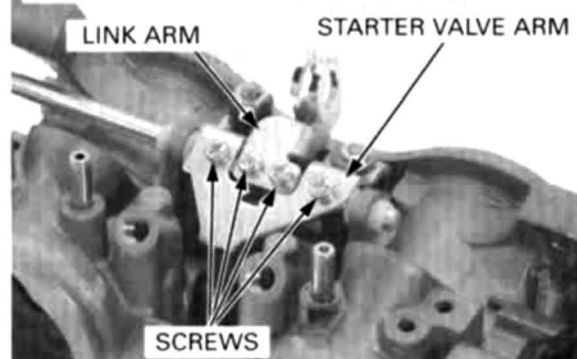
Install and tighten the starter valve arm mounting screws to the specified torque.

TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)

Install the choke cable link arm and tighten the screw to the specified torque.

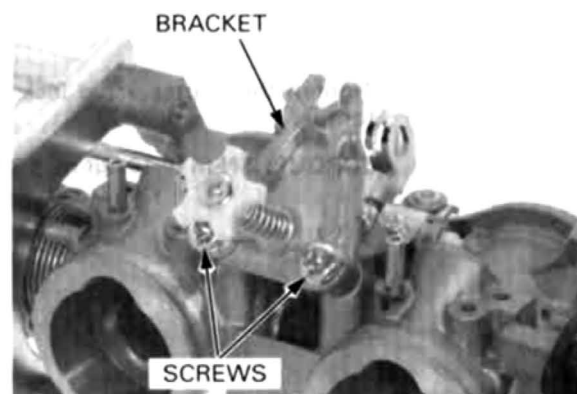
TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)

No.1/2 STARTER VALVE:



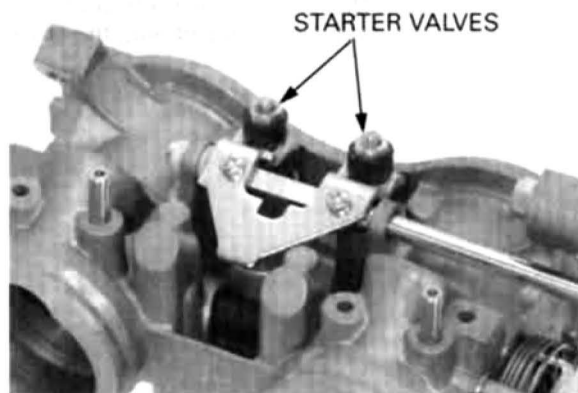
Install the choke cable/throttle stop screw bracket onto the throttle body, tighten the screws to the specified torque.

TORQUE: 5 N·m (0.50 kgf·m, 3.6 lbf·ft)



Turn the starter valve screw until it seats lightly, then back it out as noted during removal.

Install the injectors and fuel rail (page 6-68).



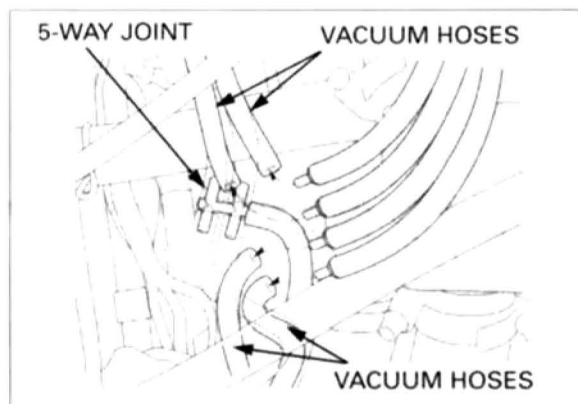
STARTER VALVE SYNCHRONIZATION

- Synchronize the starter valve with the engine at the normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 min⁻¹ (rpm) or smaller that will accurately indicate 50 min⁻¹ (rpm) change.

Open and support the front end of fuel tank (page 4-5).

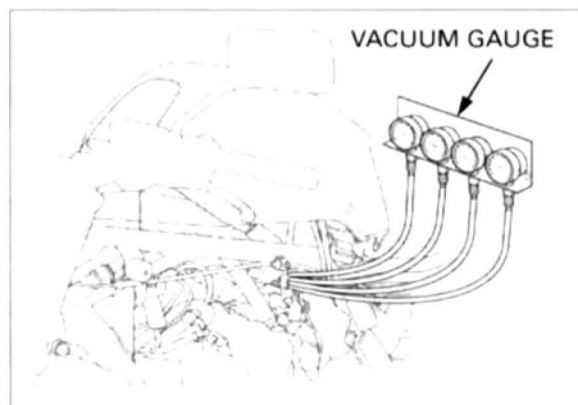
Disconnect the each cylinder vacuum hoses from the 5-way joint.

Start the engine and hold the engine speed above 2,000 min⁻¹ (rpm) for 5 seconds or more, so that the MAP sensor failure code is input into the ECM.



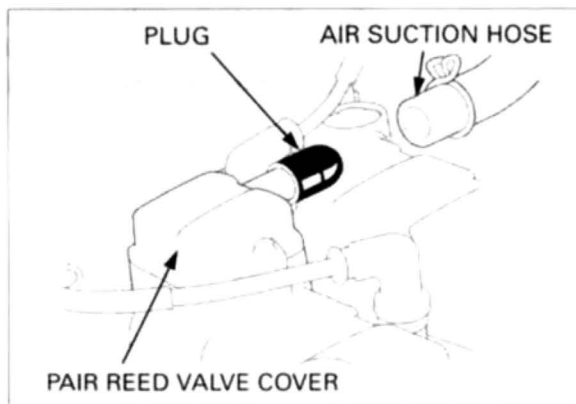
Connect the hoses to the vacuum gauge.

Connect the tachometer.



FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the PAIR suction hoses from the reed valve covers and plug the covers.



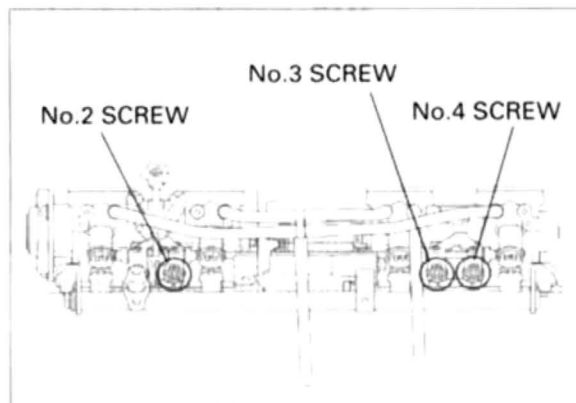
Start the engine and adjust the idle speed.

IDLE SPEED: $1,000 \pm 100 \text{ min}^{-1}$ (rpm)

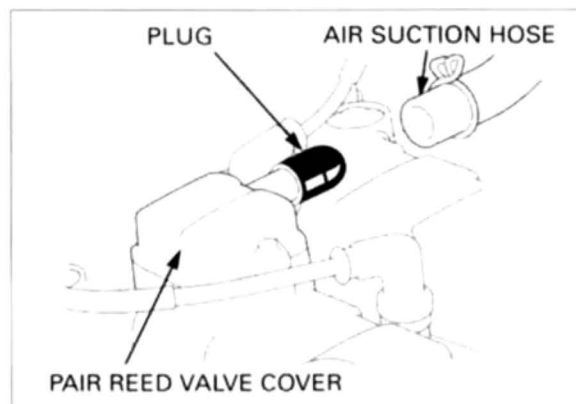


The No. 1 starter valve cannot be adjusted, it is the base starter valve.

Adjust each intake vacuum pressure with the No. 1 cylinder.



Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.



Adjust the idle speed if the idle speed differs from the specified speed.

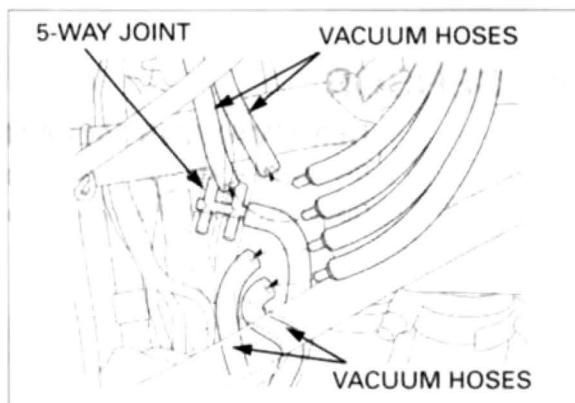
IDLE SPEED: $1,000 \pm 100 \text{ min}^{-1}$ (rpm)



Remove the vacuum gauge from the vacuum tubes. Connect the each cylinder vacuum hoses to the 5-way joint.

Reset the ECM failure code (page 6-9).

Close the fuel tank.



MAP SENSOR

OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 6-10).

Measure the voltage at the test harness terminals (page 6-14).

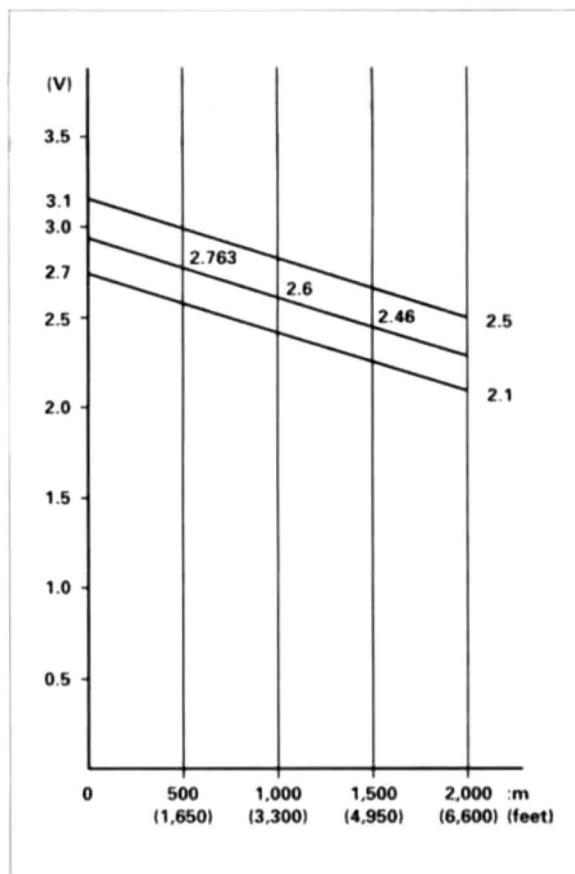
Connection: B15 (+) – B17 (–)

STANDARD: 2.7 – 3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa).

The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.

Check the sea level measurement and be sure that the measured voltage falls within the specified value.



MAP SENSOR REMOVAL/INSTALLATION

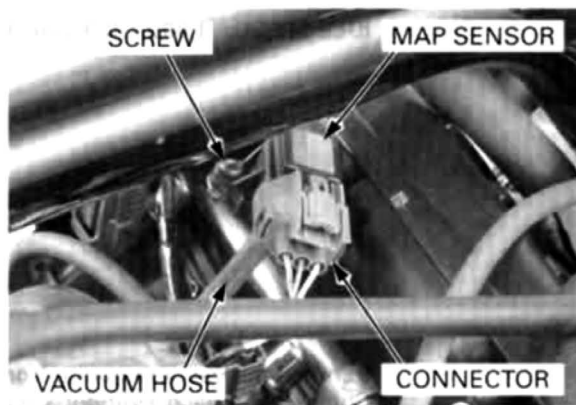
Open and support the front end of fuel tank (page 4-5).

Disconnect the MAP sensor connector.

Disconnect the vacuum hose from the MAP sensor.

Remove the screw and MAP sensor from the front air cleaner housing.

Installation is in the reverse order of removal.

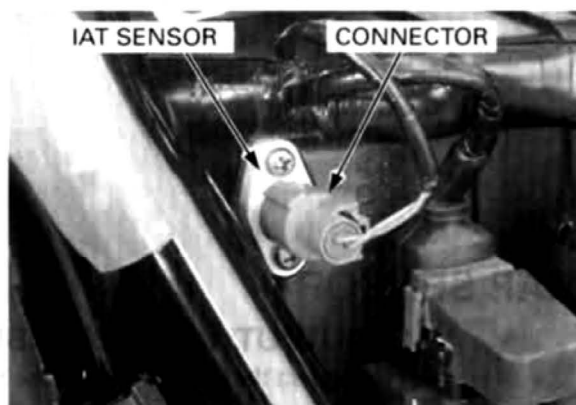


IAT SENSOR

REMOVAL/INSTALLATION

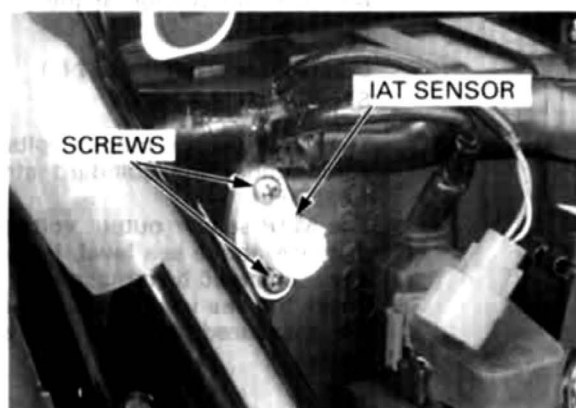
Remove the left side cover (page 3-4).

Disconnect the IAT sensor connector.



Remove the screws and IAT sensor from the rear air cleaner housing.

Installation is in the reverse order of removal.



ECT SENSOR

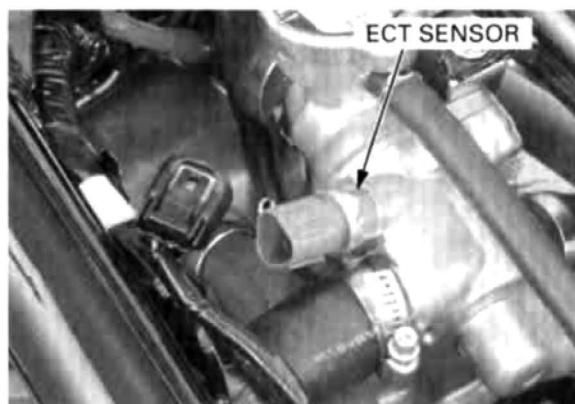
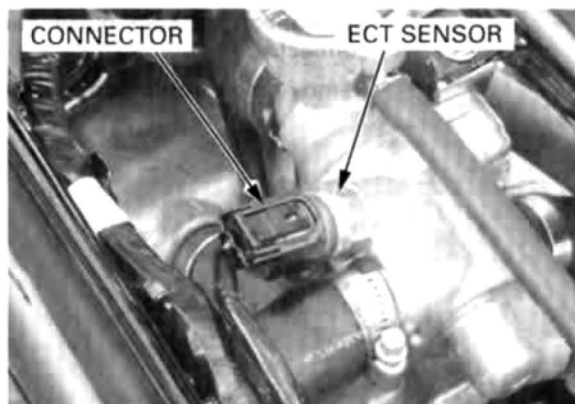
Replace the ECT sensor while the engine is cold.

REMOVAL/INSTALLATION

Drain the coolant from the system (page 7-6).
Open and support the front end of fuel tank (page 4-5).

Disconnect the ECT sensor connector from the sensor.

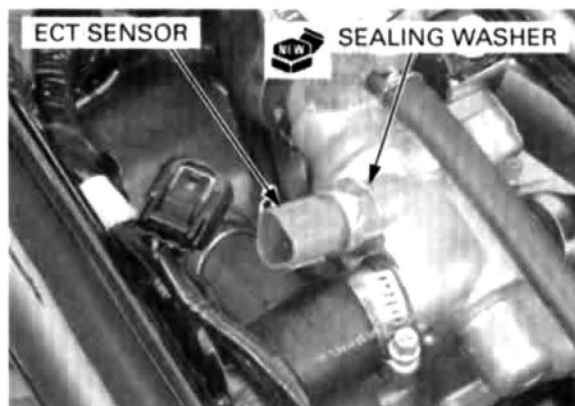
Remove the ECT sensor and sealing washer.



Always replace a sealing washer with a new one.

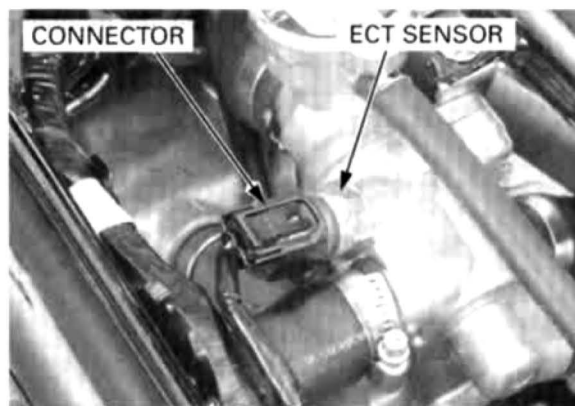
Install the new sealing washer and ECT sensor.
Tighten the ECT sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Connect the ECT sensor connector.

Fill the cooling system with recommended coolant (page 7-6).



CAM PULSE GENERATOR

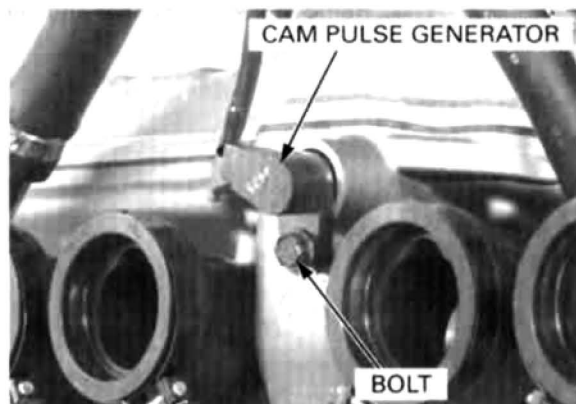
REMOVAL/INSTALLATION

Disconnect the cam pulse generator 2P (Natural) connector.

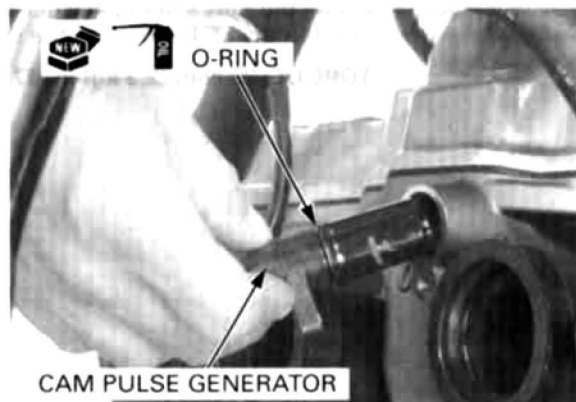
Remove the throttle body (page 6-57).



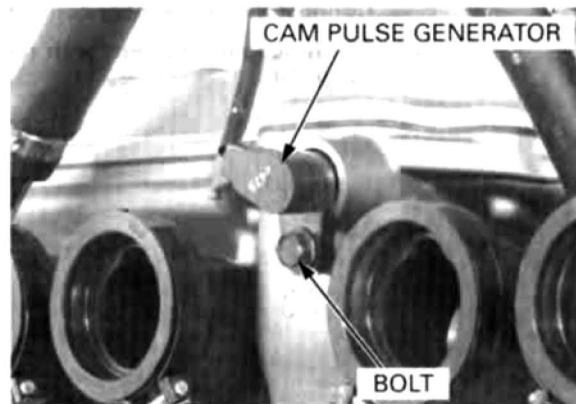
Remove the bolt and cam pulse generator from the cylinder head.



Apply oil to a new O-ring and install it onto the cam pulse generator.
Install the cam pulse generator into the cylinder head.



Install and tighten the mounting bolt securely.



Install the throttle body (page 6-63).

Route the cam pulse generator wire properly, connect the 2P (Natural) connector.

Install the removed parts in the reverse order of removal.



TP SENSOR

INSPECTION

Remove the battery cover (page 16-5).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.

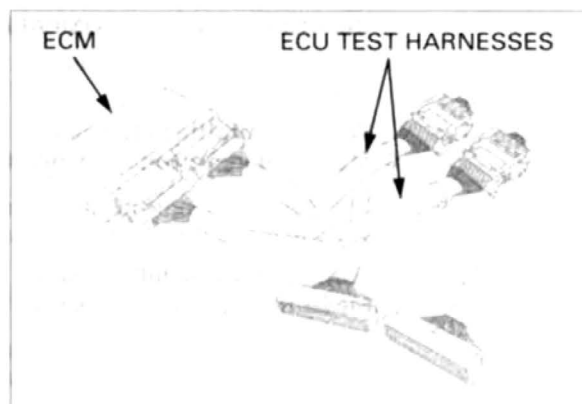
Check the connector for loose or corroded terminals.

Connect the ECU test harness between the ECM and main wire harness.

TOOL:

ECU test harness 32P

070MZ-0010201
(two required)



INPUT VOLTAGE INSPECTION

Turn the ignition switch ON and measure and record the input voltage at the test harness terminals using a digital multimeter.

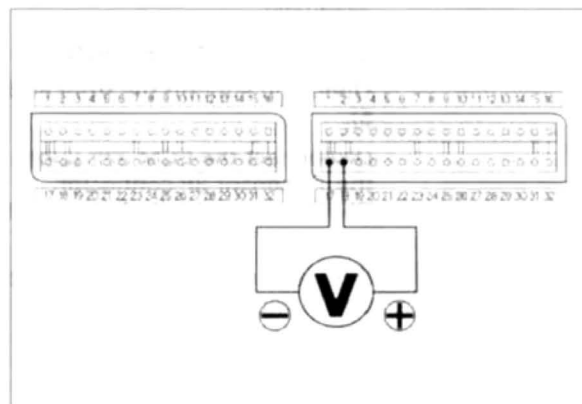
Connection:

B18 (+) – B17 (–)

Standard: 4.5 – 5.5 V

If the measurement is out of specification, check the following:

- Loose connection of the ECM multi-connector
- Open circuit in wire harness



OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

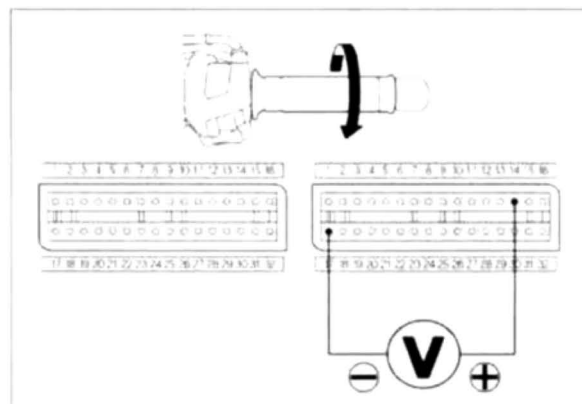
Turn the ignition switch ON and measure and record the output voltage at the test harness terminals.

Connection:

B14 (+) – B17 (–)

MEASURING CONDITION:

At throttle fully open



FUEL SYSTEM (Programmed Fuel Injection)

OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

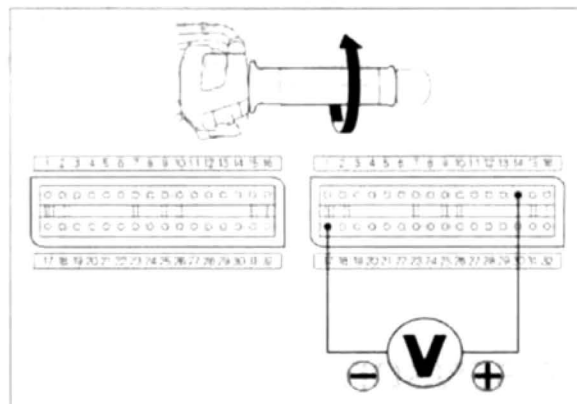
Turn the ignition switch ON and measure and record the output voltage with the throttle fully closed.

Connection:

B14 (+) – B17 (–)

MEASURING CONDITION:

At throttle fully close



CALCULATE RESULT COMPARISON

Compare the measurement to the result of the following calculation.

With the throttle fully open:

Measured input voltage X 0.824 = V_o

The sensor is normal if the measurement output voltage measured in step 2 is within 10% of V_o .

With the throttle fully closed:

Measured input voltage X 0.1 = V_c

The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of V_c .

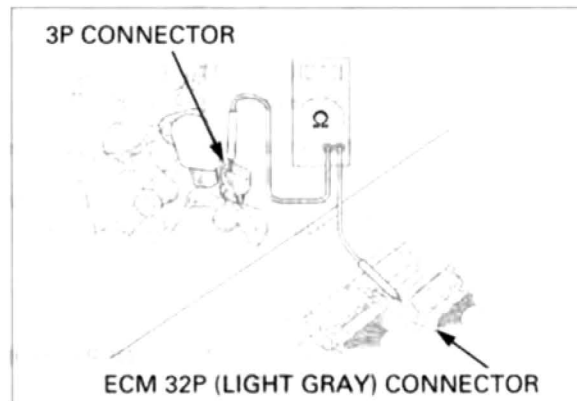
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

CONTINUITY INSPECTION

Open and support the front end of fuel tank (page 4-5).

Disconnect the ECM 32P (Light gray) connector and the TP sensor 3P connector. Check for continuity between the ECM and TP sensor.

If there is no continuity, check the open or short circuit in wire harness.



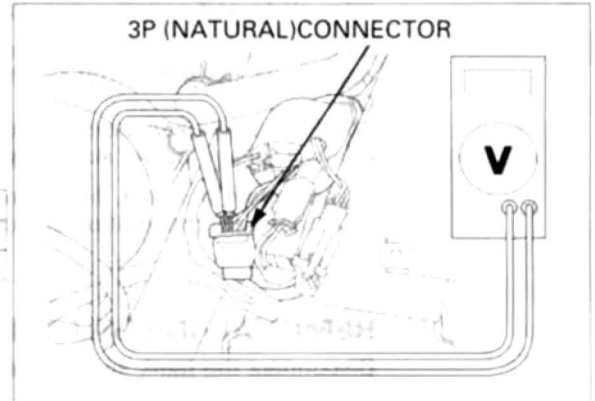
BANK ANGLE SENSOR

INSPECTION

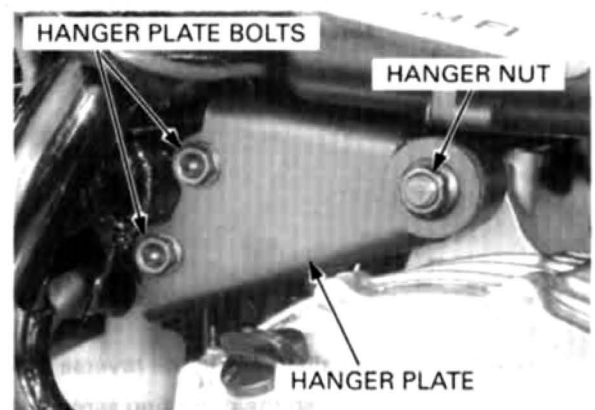
Support the motorcycle level surface.
Remove the right side cover (page 3-4).

Turn the ignition switch ON and measure the voltage between the following terminals of the bank angle sensor 3P (Natural) connector with the connector connected.

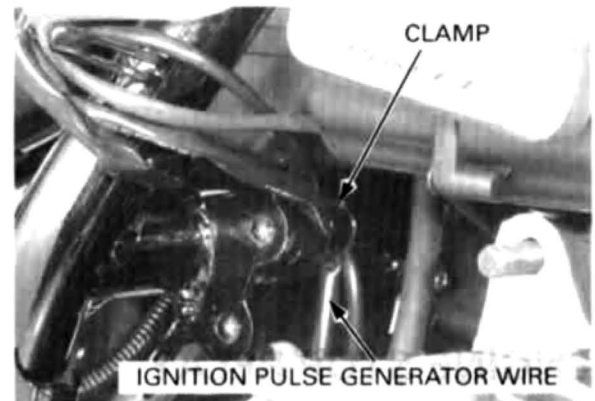
TERMINAL	STANDARD
White/Black (+) – Green (-)	Battery voltage
Red/Orange (+) – Green (-)	0 – 1 V



Remove the rear upper engine hanger nut, special washer, hanger plate bolts and hanger plate.

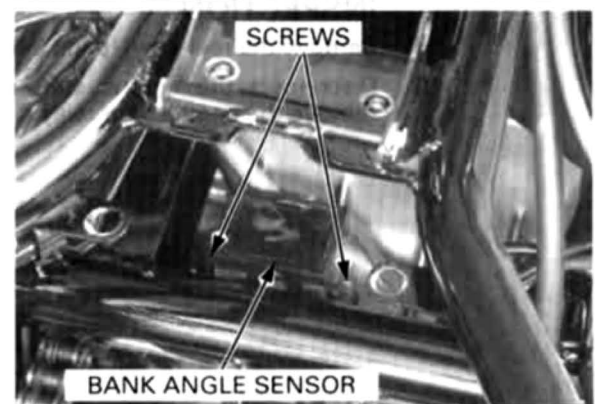


Release the bank angle sensor wire from the frame clamp.



Do not disconnect the bank angle sensor connector during inspection.

Remove the screws and bank angle sensor.



FUEL SYSTEM (Programmed Fuel Injection)

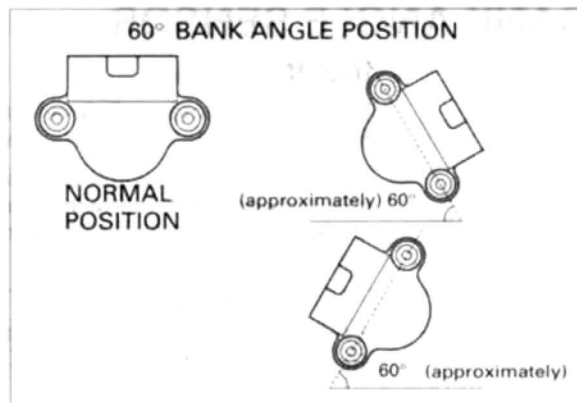
Place the bank angle sensor horizontal as shown, and ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

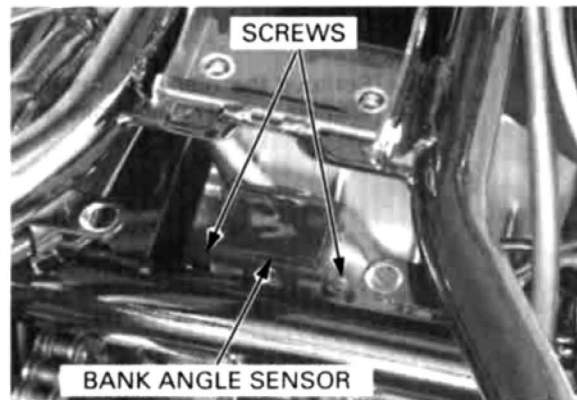
If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.



REMOVAL/INSTALLATION

Disconnect the bank angle sensor 3P (Natural) connector.

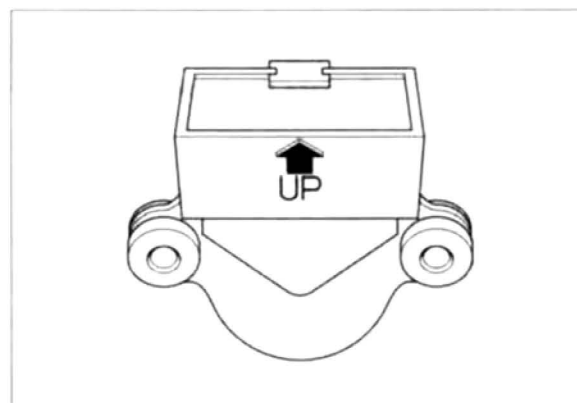
Remove the two screws, nuts and bank angle sensor.



Install the bank angle sensor with its "UP" mark facing up.

Installation is in the reverse order of removal.

Tighten the mounting screws securely.

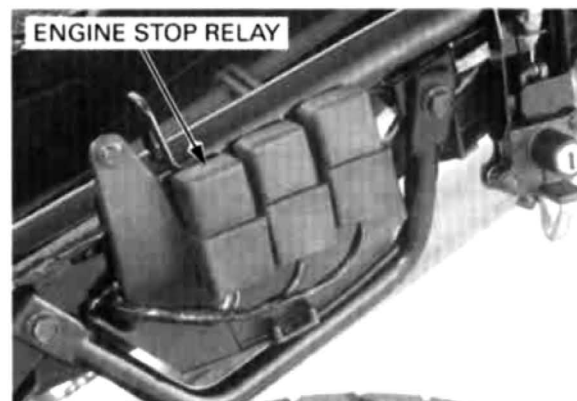


ENGINE STOP RELAY

INSPECTION

Remove the rear cowl (page 3-5).

Disconnect the engine stop relay 4P connector, remove the engine stop relay.



Connect the ohmmeter to the engine stop relay connector terminals.

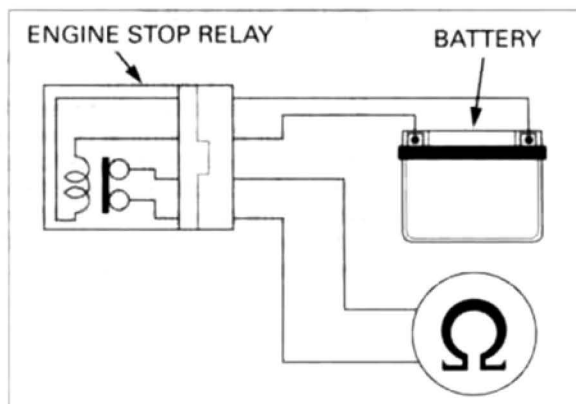
Connection: Red/White – Black/White

Connect the 12 V battery to the following engine stop relay connector terminals.

Connection: Red/Orange – Black

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the engine stop relay.

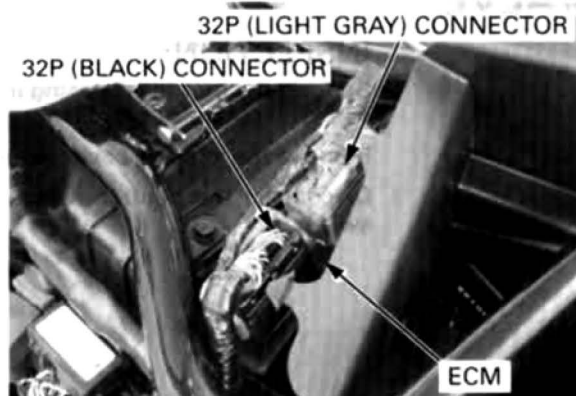


ECM (ENGINE CONTROL MODULE)

REMOVAL/INSTALLATION

Remove the battery cover (page 16-5).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.



POWER/GROUND LINE INSPECTION

Connect the test harness between the main wire harness and ECM (page 6-10).

TOOL:

ECU test harness 32P

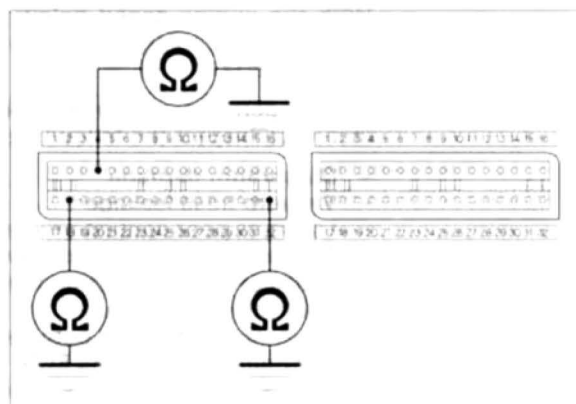
**070MZ-0010201
(two required)**

GROUND LINE

Check for continuity between the ECM test harness connector A4 terminal and ground, between the A18 terminal and ground, and between the A32 terminal and ground.

There should be continuity at all times.

If there is no continuity, check for open circuit in Green/Pink wire and Green wire.



FUEL SYSTEM (Programmed Fuel Injection)

POWER INPUT LINE

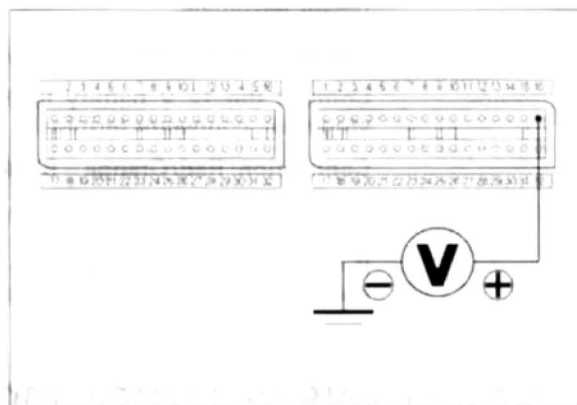
Turn the ignition switch ON with the engine stop switch in RUN position.

Measure the voltage between the ECM test harness connector B16 terminal (+) and ground.

There should be battery voltage.

If there is no voltage, check for open circuit in Black/White wire between the ECM and engine stop relay.

If the wire is OK, check for the bank angle sensor (page 6-81) and engine stop relay (page 6-82).



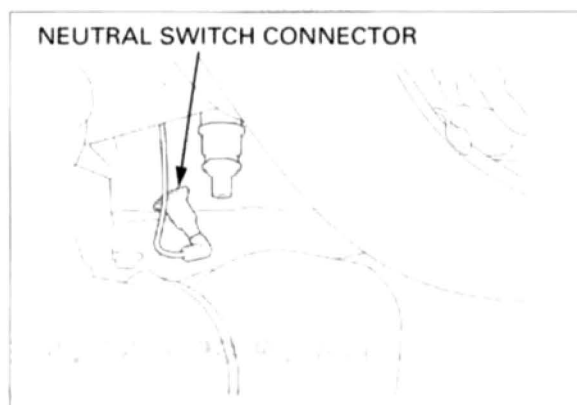
VARIABLE AIR INTAKE CONTROL VALVE

INSPECTION

Support the motorcycle using a safety stand or hoist with the transmission in neutral.

Remove the left side cover (page 3-4).

Disconnect the neutral switch connector from the switch.



Start the engine.

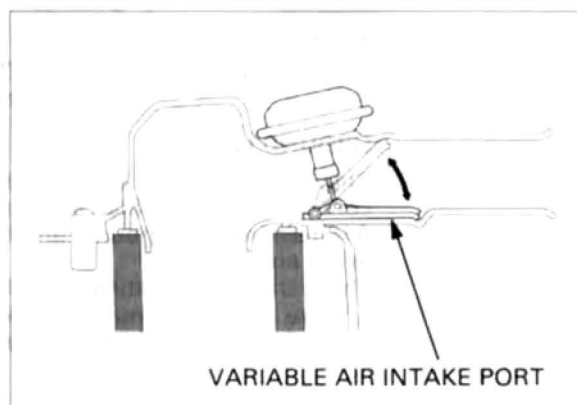
Check the operation of the variable air intake port.

With the engine speed above 5,100 rpm or the throttle opening less than 30°, the variable air intake port is open.

With the engine speed below 5,100 rpm and also the throttle opening more than 30°, the variable air intake port is closed.

If the operation of the variable air intake port is incorrect, inspect the following:

- Diaphragm damage
- Vacuum hose leakage
- Loose or poor contact on the vacuum hose
- Bypass control solenoid valve (page 6-85)
- Loose or poor contact on the bypass control solenoid valve connector
- Open or short circuit between the bypass control solenoid valve and the ECM
- One-way valve and/or vacuum chamber damage (page 6-85)

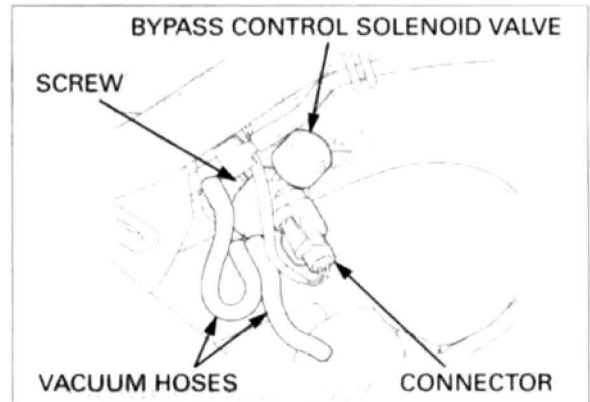


BYPASS CONTROL SOLENOID VALVE

Removal/Installation

Remove the seat (page 3-4) and left side cover (page 3-4).

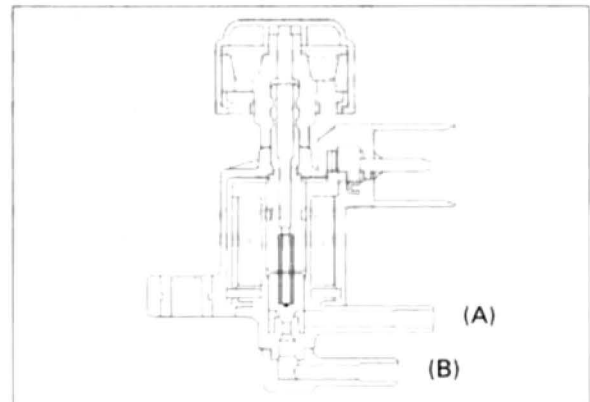
Remove the screw and bypass control solenoid valve from the rear air cleaner housing. Disconnect the vacuum hoses from the bypass control solenoid valve.



Inspection

Remove the bypass control solenoid valve.

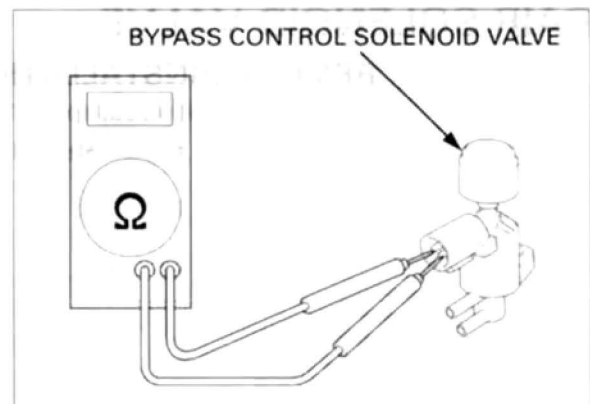
Check that the air should flow (A) to (B), only when the 12V battery is connected to the bypass control solenoid valve terminal.



Check the resistance between the terminals of the bypass control solenoid valve.

STANDARD: 28 – 32 Ω (20 °C/68 °F)

If the resistance is out of specification, replace the bypass control solenoid valve.



ONE-WAY VALVE

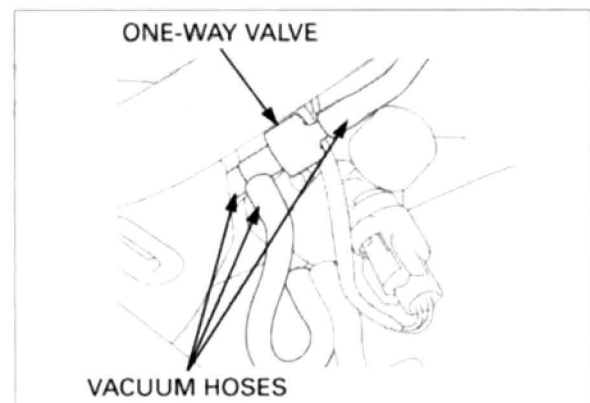
Removal/Installation

Remove the seat (page 3-4) and left side cover (page 3-4).

Disconnect the vacuum hose and the one-way valve.

Installation is in the reverse order of removal.

Route the vacuum hoses correctly.



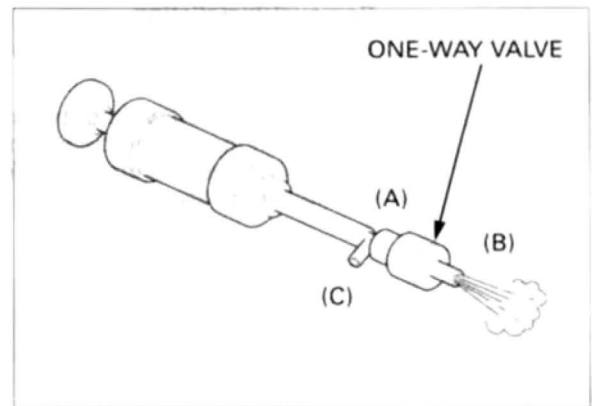
FUEL SYSTEM (Programmed Fuel Injection)

Inspection

Check the one-way valve operation as follows:

- Air should flow (A) to (B)
- Air should flow (A) to (C)
- Air should not flow (B) to (A)
- Air should not flow (B) to (C)

If the operation is incorrect, replace the one-way valve.



VACUUM CHAMBER

Removal/Installation

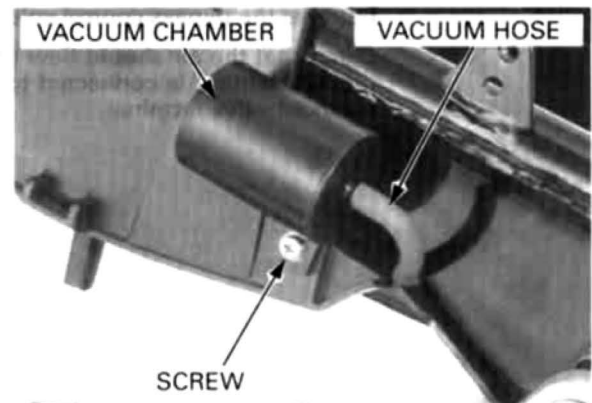
Remove the rear cowl (page 3-5).

Disconnect the vacuum hose from the vacuum chamber.

Remove the screw and vacuum chamber from the seat rail.

Inspection

Check the vacuum chamber for damage and scratches, replace if necessary.

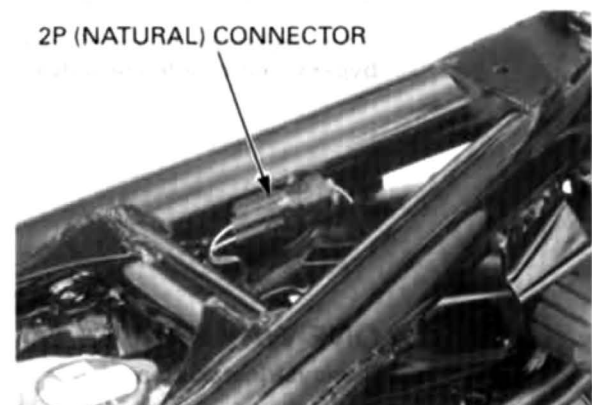


PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

Remove the ignition coil (page 17-7).

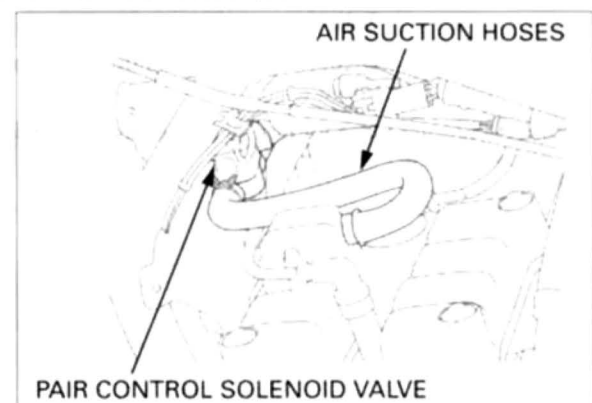
Disconnect the PAIR solenoid valve 2P (Natural) connector.



Disconnect the PAIR air suction hoses.

Remove the bolt and PAIR solenoid valve.

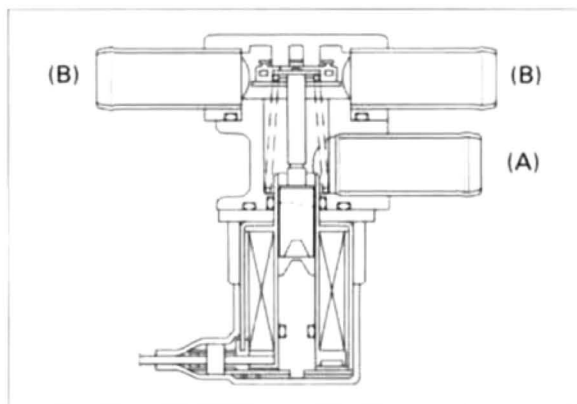
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR solenoid valve.

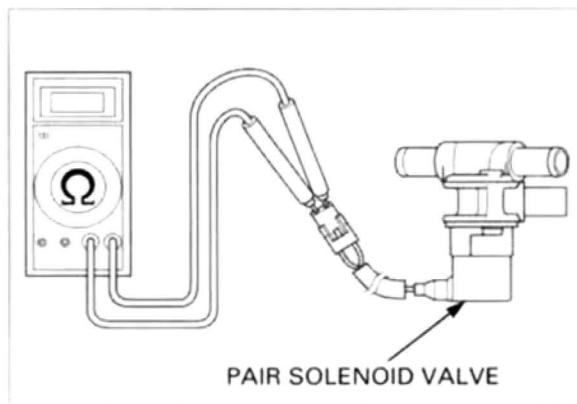
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the PAIR solenoid valve terminals.



Check the resistance between the terminals of the PAIR solenoid valve.

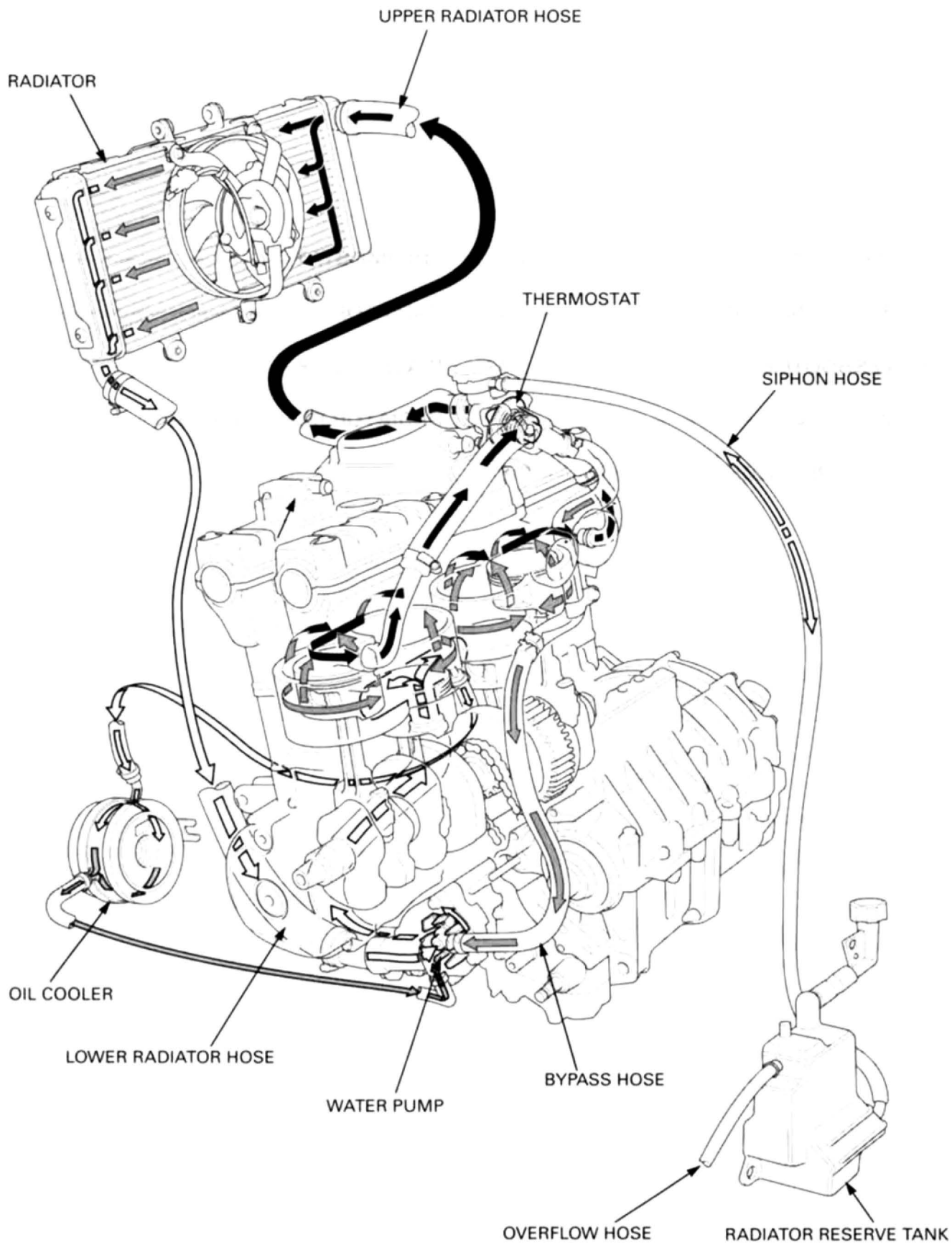
STANDARD: 20 – 24 Ω (20 °C/68 °F)

If the resistance is out of specification, replace the PAIR solenoid valve.



SYSTEM FLOW PATTERN	7-2	THERMOSTAT	7-8
SERVICE INFORMATION	7-3	RADIATOR	7-10
TROUBLESHOOTING	7-4	WATER PUMP	7-15
SYSTEM TESTING	7-5	RADIATOR RESERVE TANK	7-18
COOLANT REPLACEMENT	7-6		

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

NOTICE

Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester
- Refer to the fan motor switch inspection (page 19-20) and coolant temperature sensor inspection (page 19-19).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.74 liter (2.90 US qt, 2.41 Imp qt)
	Reserve tank	0.31 liter(0.33 US qt, 0.27 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		50% mixture with soft water

TORQUE VALUES

Water pump cover flange bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Coolant drain bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Lower radiator hose joint mounting bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
ECT/thermo sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Cooling fan mounting nut	3 N·m (0.27 kgf·m, 2.0 lbf·ft)	Apply a locking agent to the threads
Fan motor mounting nut	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Fan motor bracket mounting nut	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor relay
- Faulty water pump

Engine temperature too low

- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty cooling fan motor relay

Coolant leak

- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Open and support the front end of fuel tank (page 4-5).

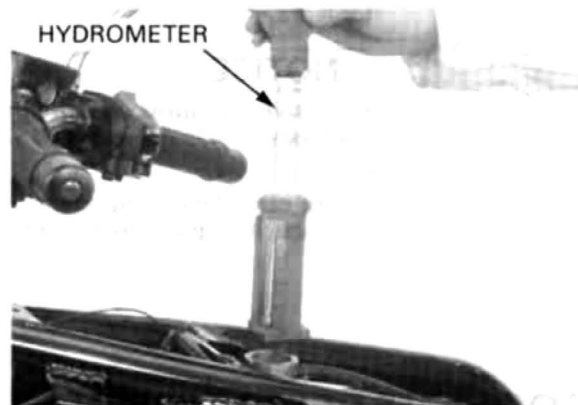
Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").

For maximum corrosion protection, a 50 – 50% solution of ethylene glycol and distilled water is recommended (page 7-6).

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio%	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
	60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the sealing surfaces.

Remove the radiator cap (page 7-5).

Pressure test the radiator cap.

Replace the radiator cap if it does not hold pressure, or if relief pressure is too high too low. If must hold specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:

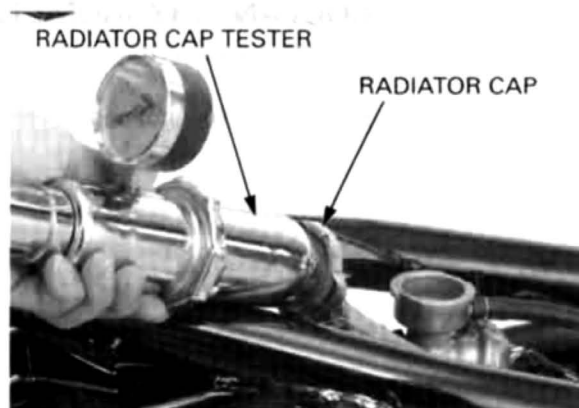
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)

Pressure the radiator, engine and hoses, and check for leaks.

NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

Repair or replace components if the system will not hold specified pressure for at least 6 seconds.



COOLANT REPLACEMENT

PREPARATION

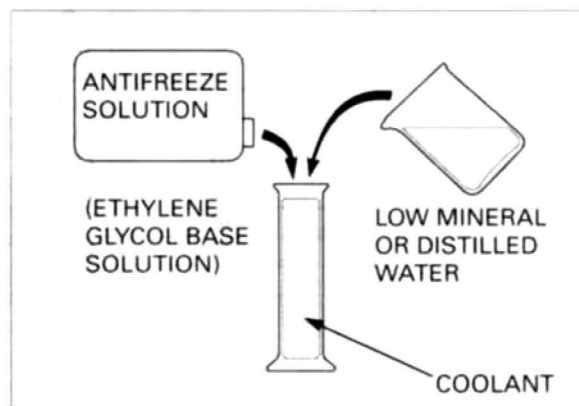
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing corrosion protection inhibitors

RECOMMENDED MIXTURE:

50 – 50 (Distilled water and antifreeze)



When filling the system or reserve tank with a coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface.

REPLACEMENT/AIR BLEEDING

Remove the radiator cap (page 7-5).

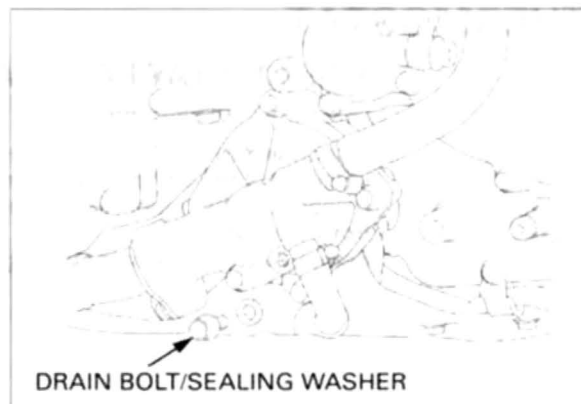


Remove the left crankcase side cover (page 8-4).

Remove the drain bolt on the water pump cover and drain the system coolant.

Reinstall the drain bolt with the new sealing washer. Tighten the drain bolt to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

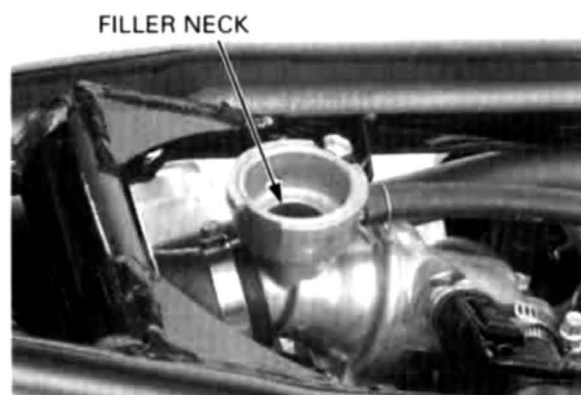


Disconnect the siphon hose and drain the reserve tank coolant.

Empty the coolant and rinse the inside of the reserve tank with water.



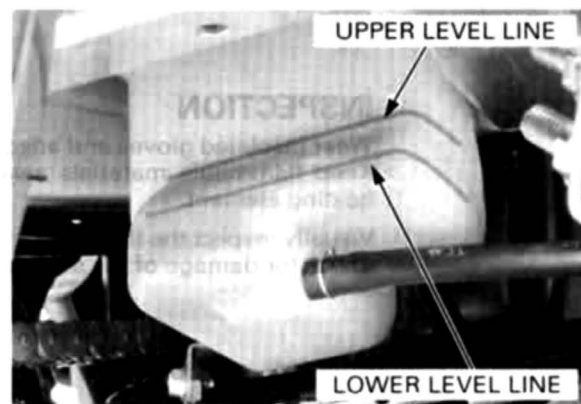
Fill the system with the recommended coolant through the filler opening up to filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follow:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle 3 – 4 times to bleed air from the system.
3. Stop the engine and add coolant up to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.



THERMOSTAT

THERMOSTAT REMOVAL

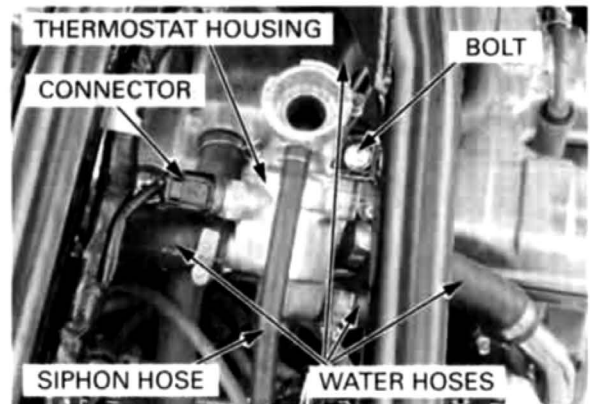
Drain the coolant (page 7-6).

Disconnect the ECT sensor connector.

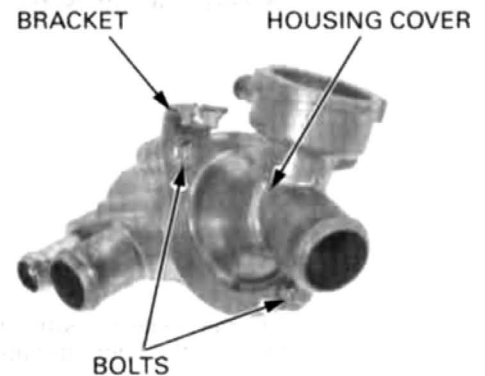
Disconnect the siphon hose from the filler neck.

Disconnect the upper radiator hose and water hoses from the housing.

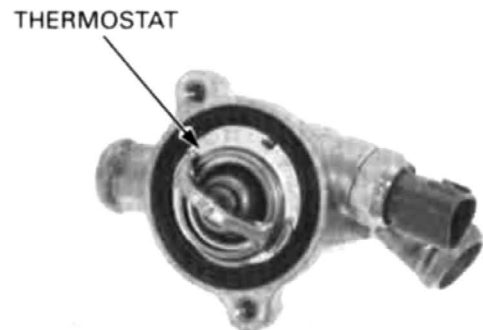
Remove the thermostat housing mounting bolt.



Remove the thermostat housing cover mounting bolts, bracket and thermostat housing cover.



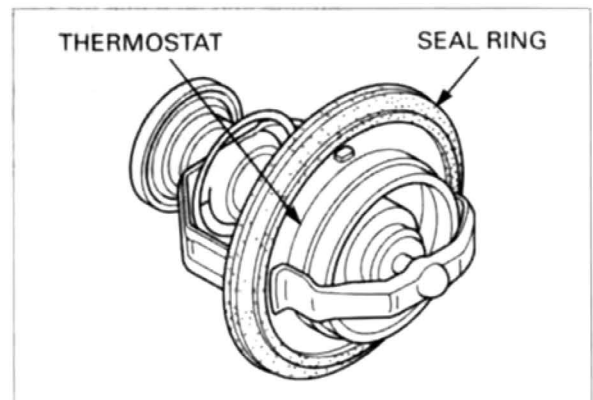
Remove the thermostat from the housing.



INSPECTION

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element.

Visually inspect the thermostat for damage. Check for damage of the seal ring.



Do not let the thermostat or thermometer touch the pan, or you will get false reading.

Heat the water with an electric heating element to operating temperature for 5 minutes.

Suspend the thermostat in heated water to check its operation.

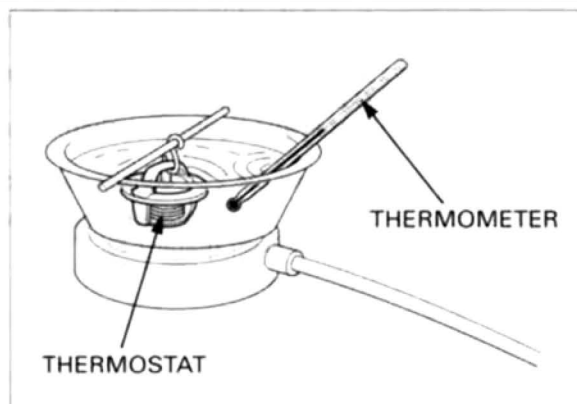
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

THERMOSTAT BEGIN TO OPEN:

80 – 84 °C (176 – 183 °F)

VALVE LIFT:

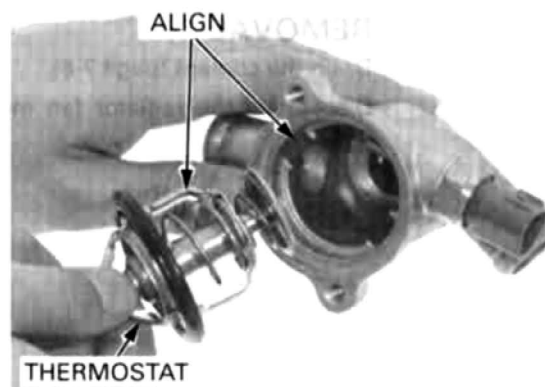
8 mm (0.3 in) minimum at 95 °C (203 °F)



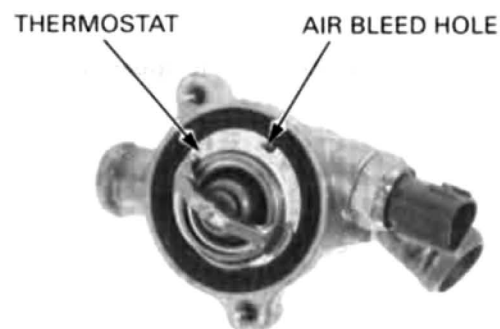
THERMOSTAT INSTALLATION

Make sure the air bleed hole on the thermostat facing up.

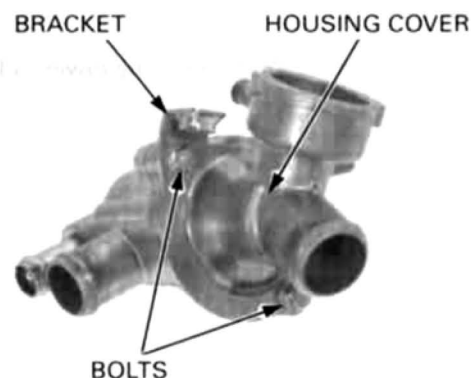
Install the thermostat into the housing while aligning it with the thermostat housing groove.



Make sure that the air bleed hole facing up as shown.

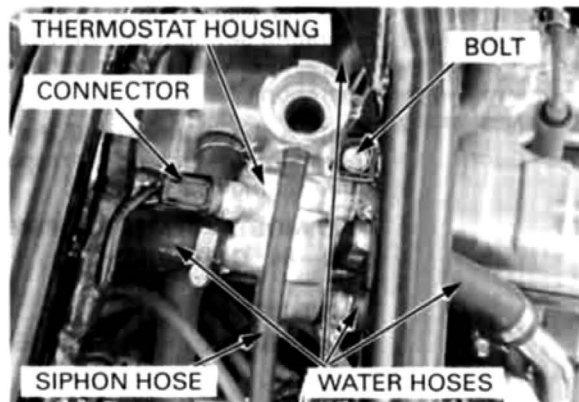


Install the thermostat housing cover and bracket, tighten the cover bolts securely.



COOLING SYSTEM

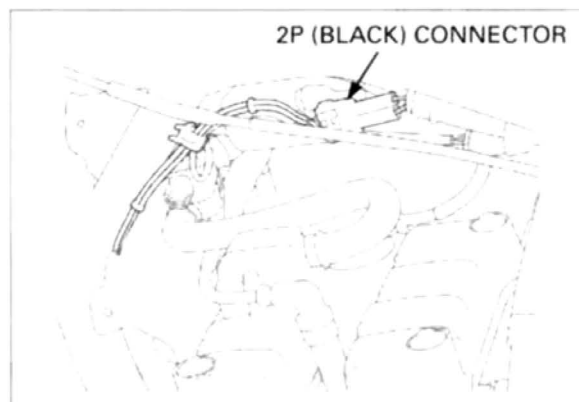
Install the thermostat housing onto the frame.
Connect the water hoses and upper radiator hose and tighten the hose bands securely.
Connect the siphon hose.
Install and tighten the thermostat housing mounting bolt.
Connect the ECT sensor connector.
Fill the system with recommended coolant and bleed the air (page 7-6).



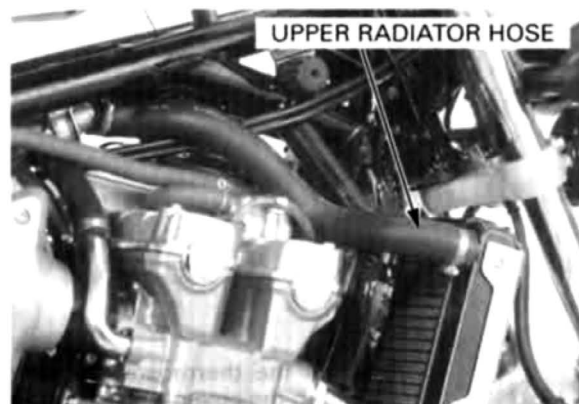
RADIATOR

REMOVAL

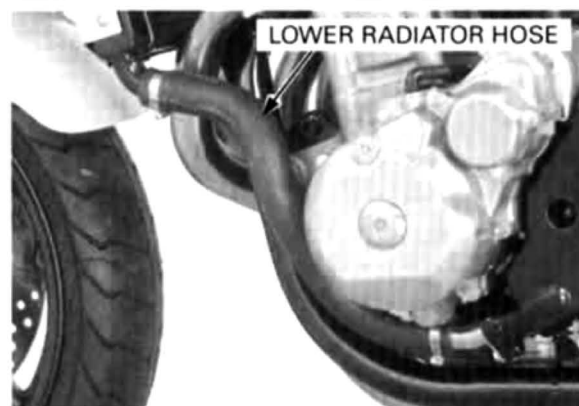
Drain the coolant (page 7-6).
Disconnect the radiator fan motor 2P (Black) connector.



Disconnect the upper radiator hose.

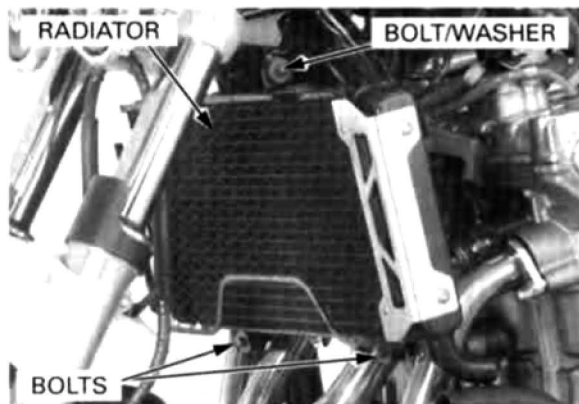


Disconnect the lower radiator hose.



Remove the radiator lower mounting bolts.

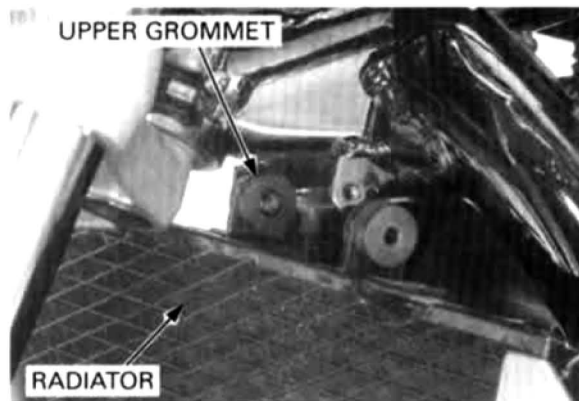
Remove the radiator upper mounting bolt and washer.



Slide the radiator to the right, then release the upper grommet from the frame boss.

Remove the radiator assembly.

Be careful not to damage the radiator core.



DISASSEMBLY

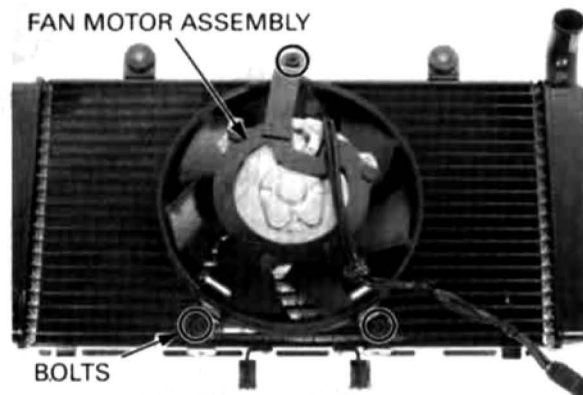
Remove the bolts and radiator grill.

RADIATOR GRILL



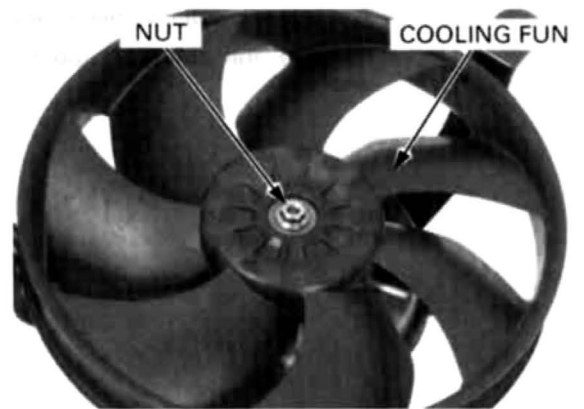
Remove the three bolts and cooling fan motor assembly.

FAN MOTOR ASSEMBLY

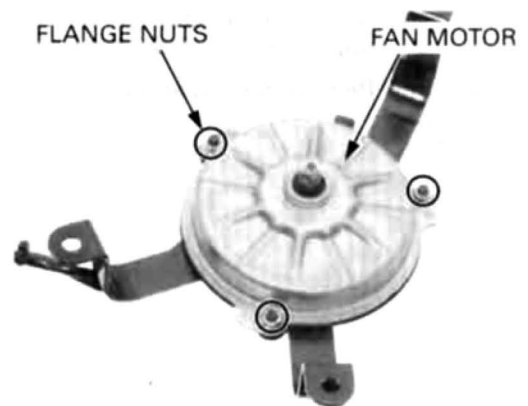


COOLING SYSTEM

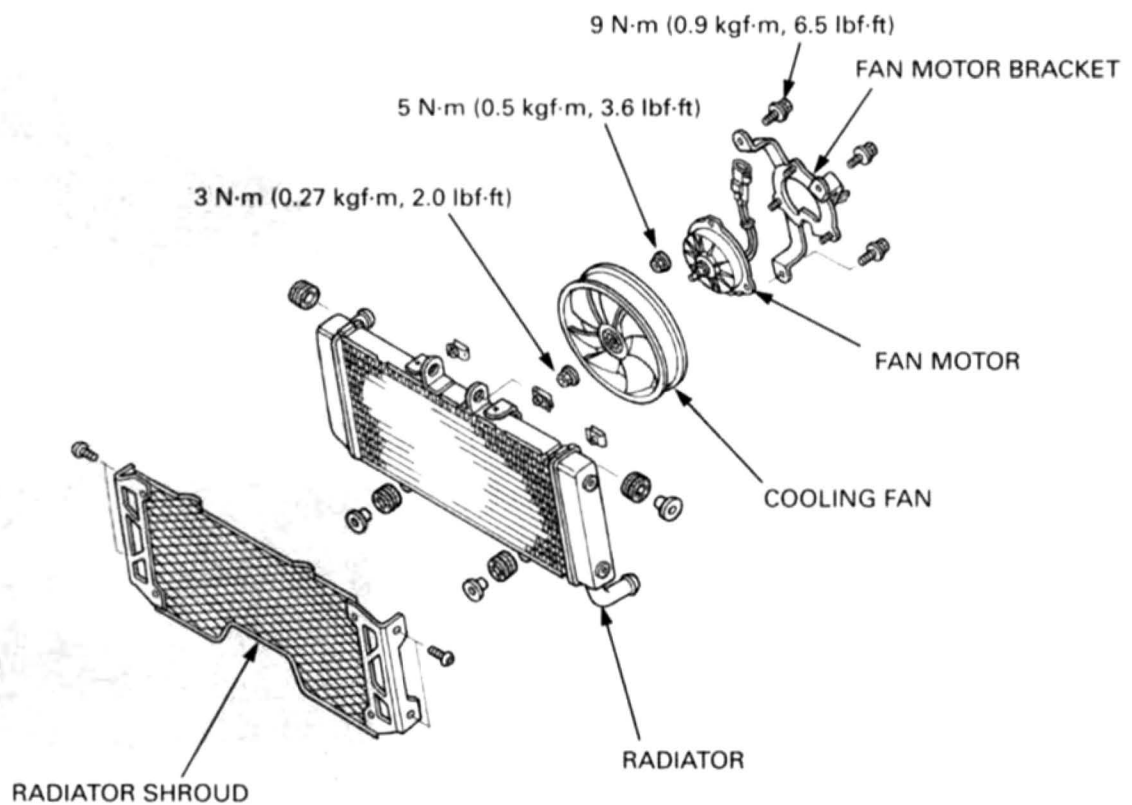
Remove the nut and cooling fan.



Remove the flange nuts and fan motor from the fan motor shroud.

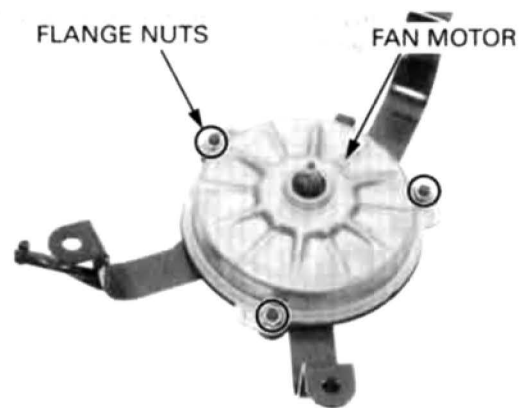


ASSEMBLY

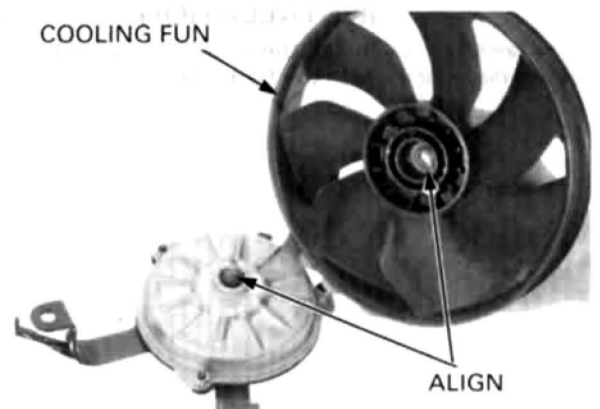


Install the fan motor onto the fan motor shroud and tighten the flange nuts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

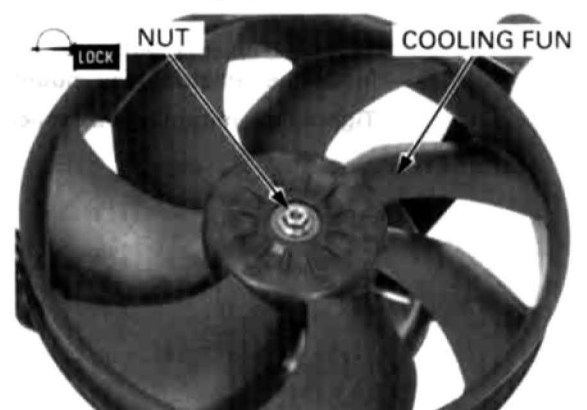


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



Apply a locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.

TORQUE: 3 N·m (0.27 kgf·m, 2.0 lbf·ft)

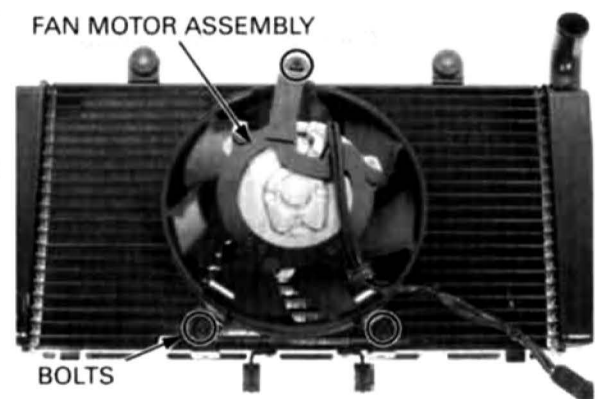


Install the cooling fan motor assembly onto the radiator.

Install and tighten the fan motor bracket bolts.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

Install the radiator sub-harness connector to the fan motor bracket clamp.



COOLING SYSTEM

Install the radiator grill and tighten the bolts securely.

RADIATOR GRILL

BOLTS

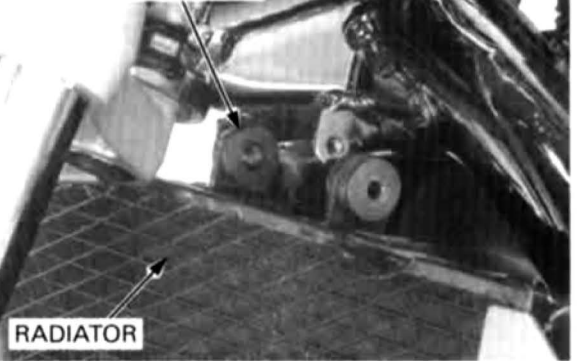


INSTALLATION

Be careful not to damage the radiator core.

Install the radiator assembly, aligning its grommet with the frame boss.

UPPER GROMMET

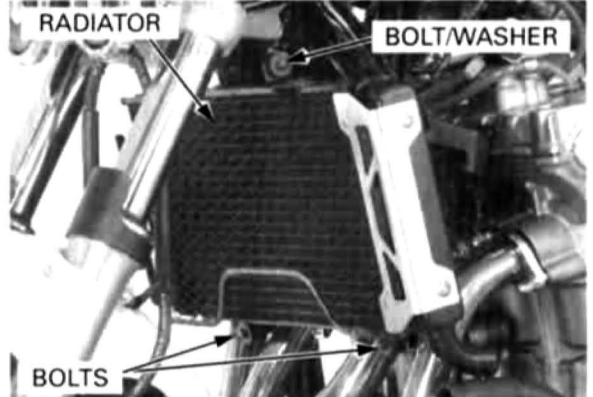


RADIATOR

Install the washer and upper mounting bolt.
Install the radiator lower mounting bolts.
Tighten the mounting bolts securely.

RADIATOR

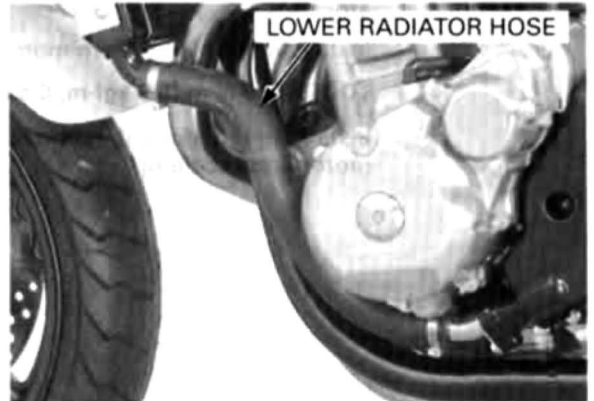
BOLT/WASHER



BOLTS

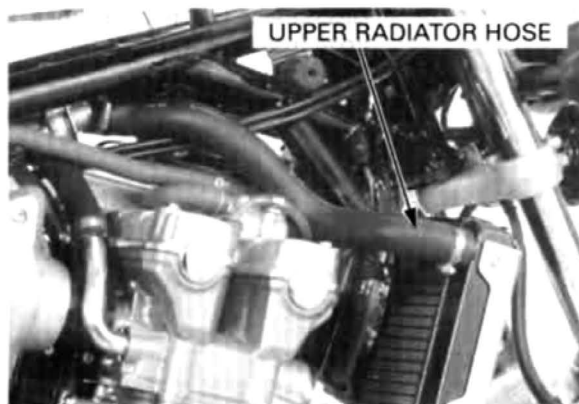
Connect the lower radiator hose.

LOWER RADIATOR HOSE

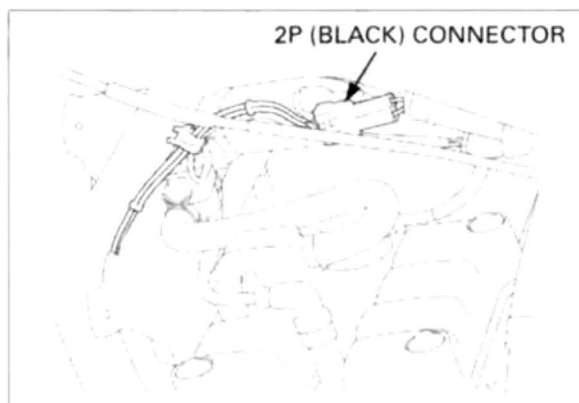


Connect the upper radiator hose.

Fill the system with recommended coolant (page 7-6).



Route the fan motor wire properly, and connect the 2P (Black) connector.

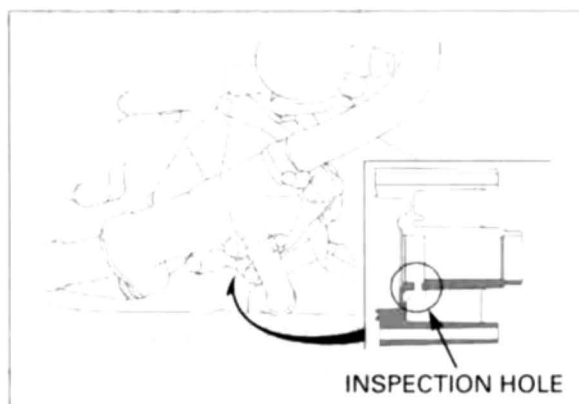


WATER PUMP

MECHANICAL SEAL INSPECTION

Inspect the inspection hole for signs of coolant leakage.

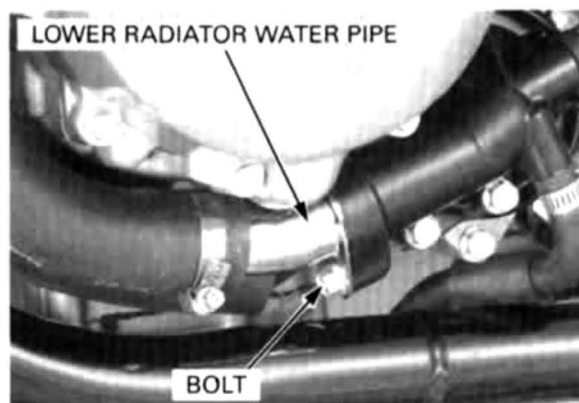
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



REMOVAL

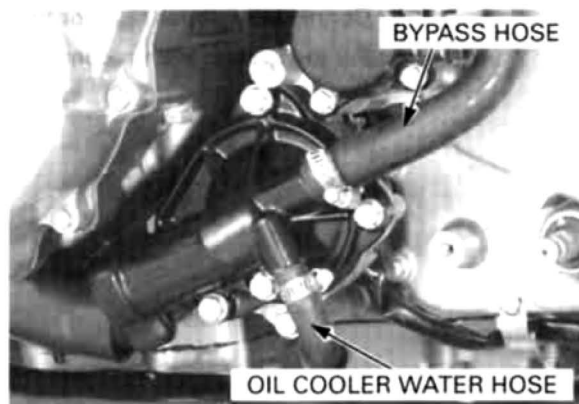
Remove the left crankcase side cover (page 8-4).
Drain the coolant (page 7-6).

Remove the bolt and disconnect the lower radiator hose joint pipe from the water pump cover.

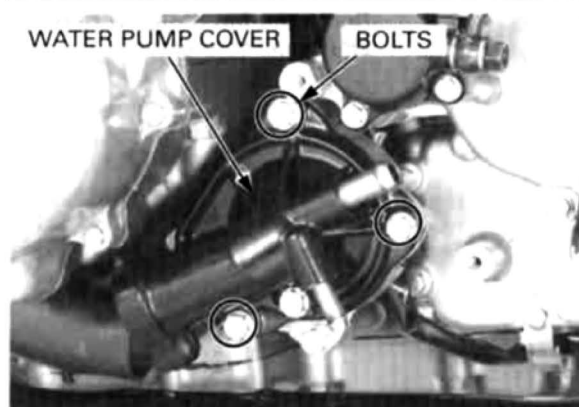


COOLING SYSTEM

Disconnect the bypass hose and oil cooler water hose from the water pump cover.

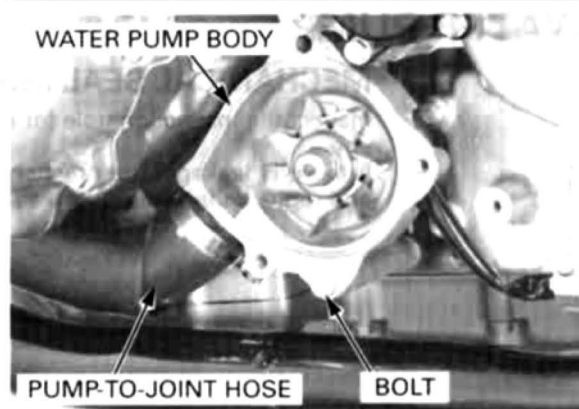


Remove the two water pump cover bolts, water pump mounting bolts, water pump cover and O-ring.



Disconnect the water pump-to-water joint hose from the water pump body.

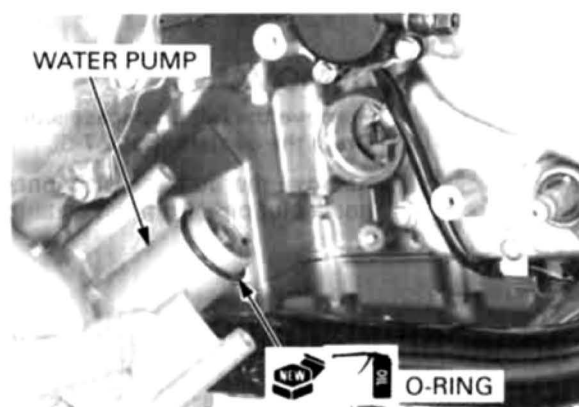
Remove the water pump body mounting bolt and the water pump body from the crankcase.



INSTALLATION

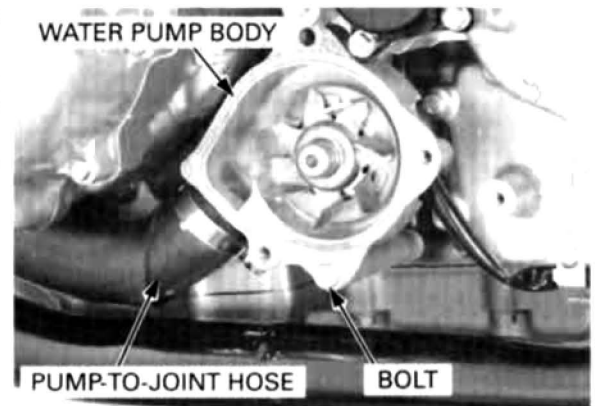
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft end by turning the water pump impeller.

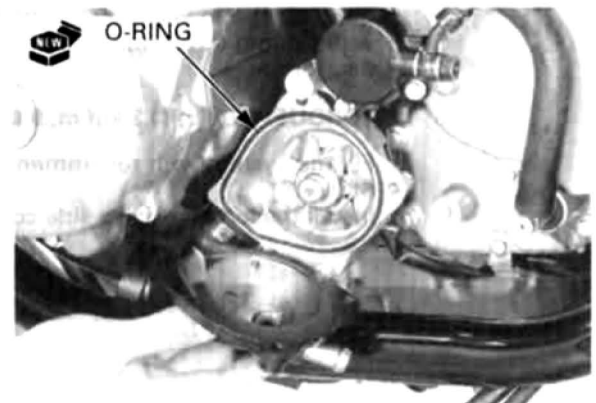


Connect the water pump-to-water joint hose to the water pump and tighten the clamp screws.

Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.
Install and tighten the water pump body mounting bolt.

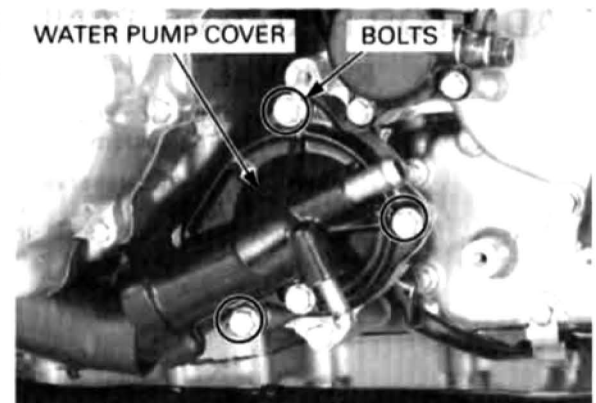


Install a new O-ring into the groove in the water pump body.

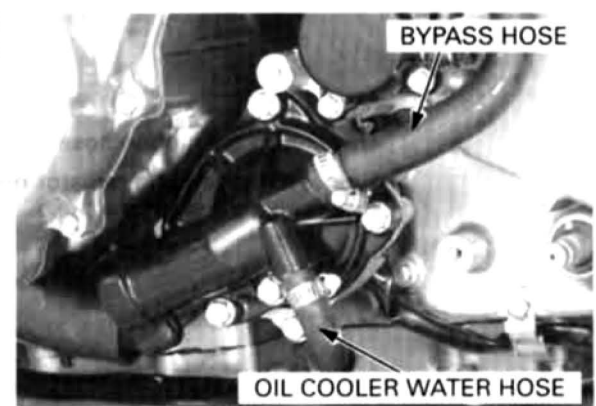


Install the water pump cover, water pump mounting bolt and two cover mounting bolts.
Tighten the water pump cover mounting bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

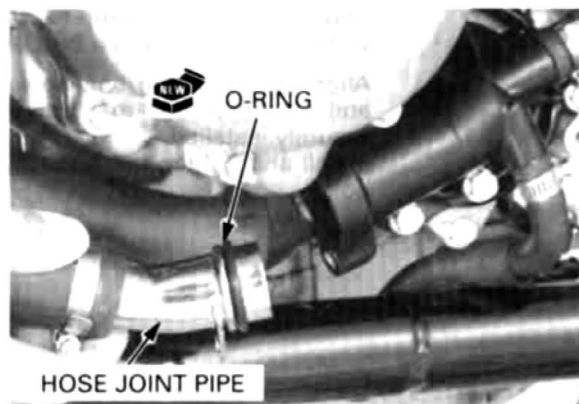


Connect the oil cooler water hose and bypass hose to the water pump cover and tighten the clamp screws securely.



COOLING SYSTEM

Install a new O-ring onto the flange of the lower radiator water hose joint pipe.

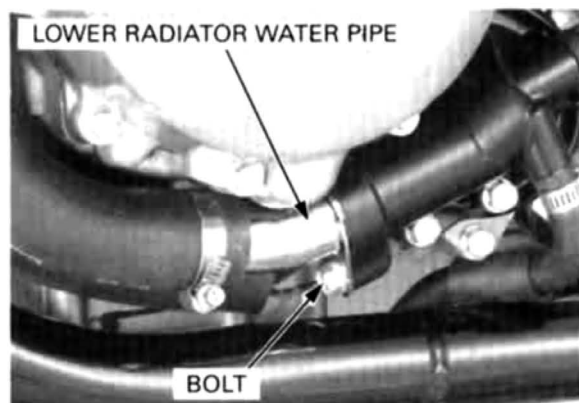


Connect the lower radiator water joint pipe to the water pump cover and tighten the bolt to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Fill the system with recommended coolant (page 7-6).

Install the left crankcase side cover (page 8-12).



RADIATOR RESERVE TANK

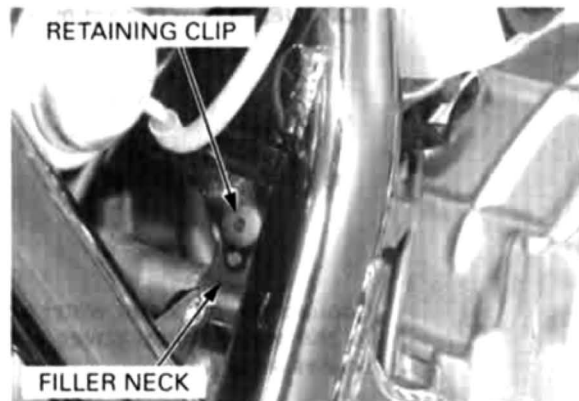
REMOVAL

Remove the right side cover (page 3-4).

Drain the cooling system (page 7-6).

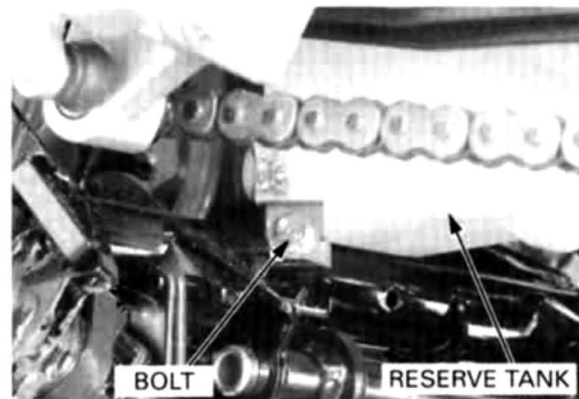
Remove the radiator reserve tank filler neck retaining clip.

Disconnect the filler neck joint hose from the reserve tank.

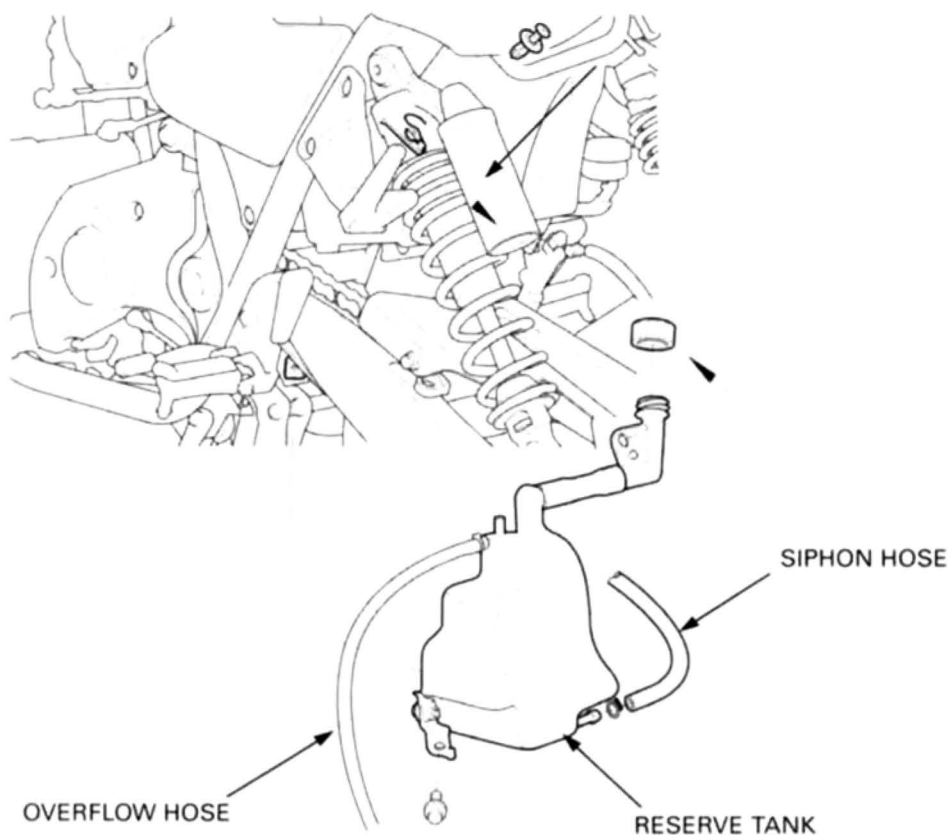


Disconnect the siphon hose from the reserve tank.

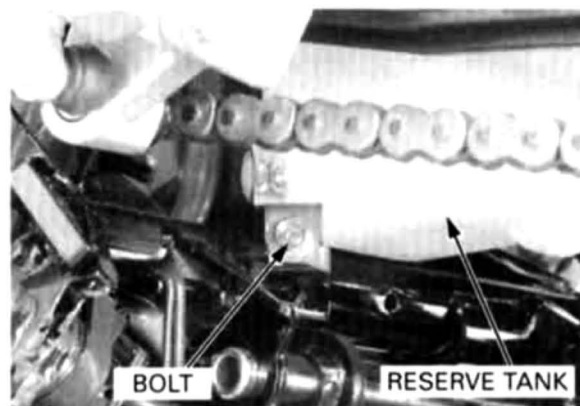
Remove the bolt and radiator reserve tank and then disconnect the overflow hose.



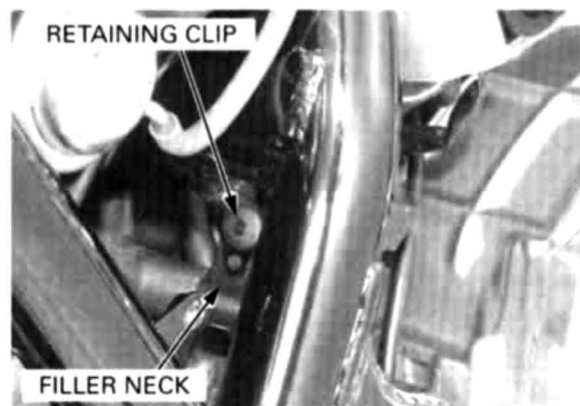
INSTALLATION



Connect the overflow hose to the reserve tank.
 Install the reserve tank onto the frame while connecting the filler neck joint hose.
 Install and tighten the reserve tank mounting bolt.
 Connect the siphon hose.



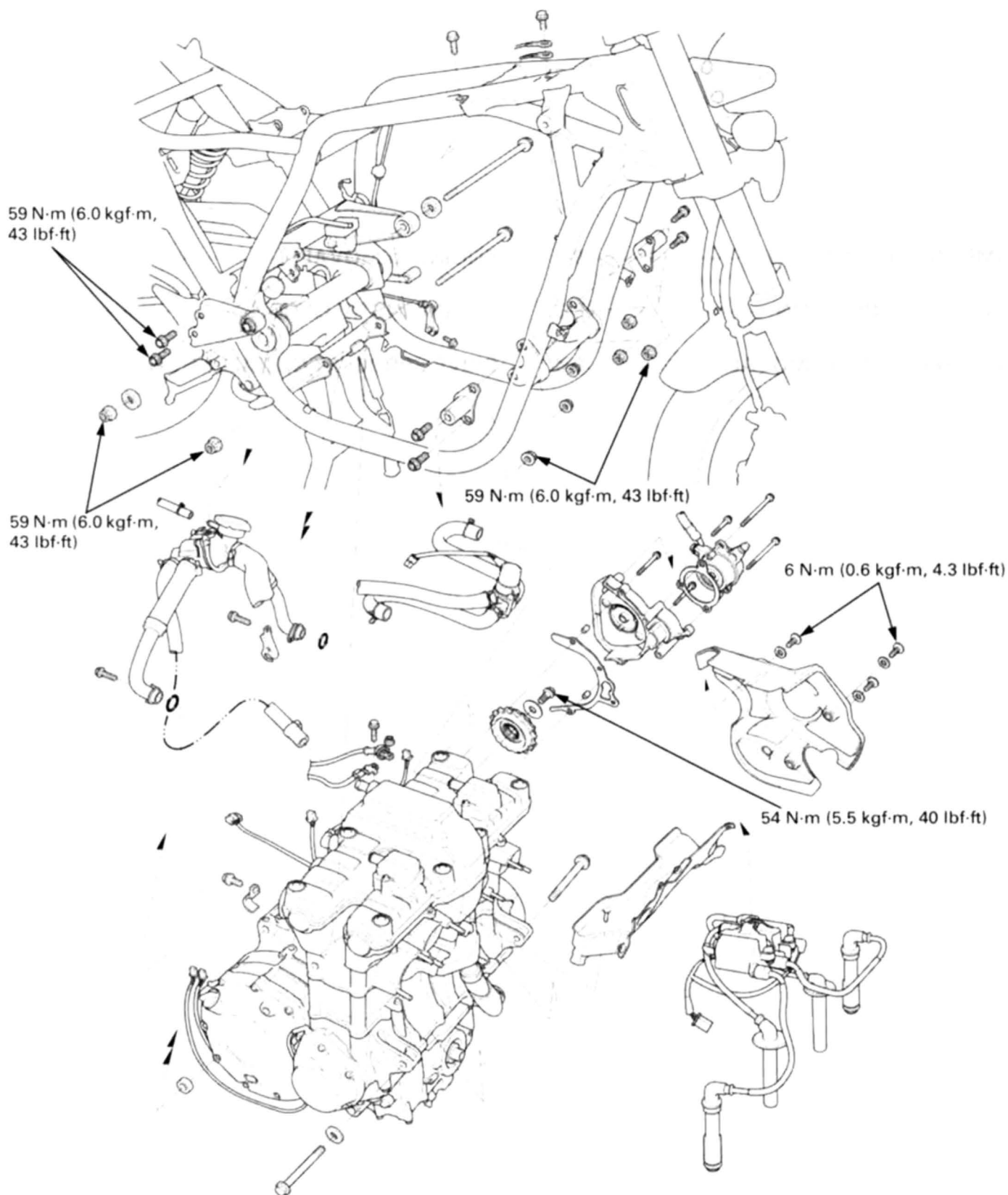
Install the filler neck retaining clip.
 Fill the system with recommended coolant (page 7-6).
 Install the right side cover (page 3-4).



8. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION	8-2	ENGINE REMOVAL	8-5
SERVICE INFORMATION	8-3	ENGINE INSTALLATION	8-8
DRIVE SPROCKET REMOVAL	8-4	DRIVE SPROCKET INSTALLATION	8-12

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

NOTICE

Do not use the oil filter as a jacking point.

- The following components require engine removal for service.
 - Crankshaft (page 12-5)
 - Transmission (page 12-15)
- When installing the engine, be sure to **tighten** the engine mounting fasteners to the specified torque in the specified sequence. If you **mistake the tighten torque or sequence**, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

SERVICE DATA

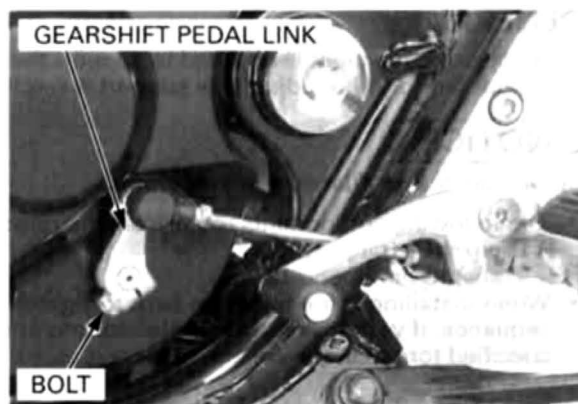
ITEM		SPECIFICATIONS
Engine dry weight		87.8 kg (193.6 lbs)
Engine oil capacity	After disassembly	4.8 liter (5.1 US qt, 4.2 Imp qt)
Coolant capacity	Radiator and engine	2.74 liter (2.90 US qt, 2.41 Imp qt)

TORQUE VALUES

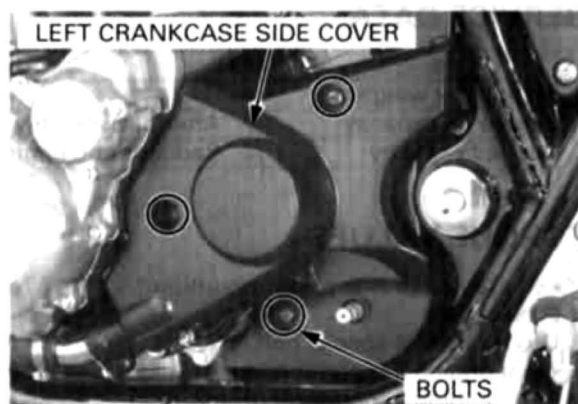
Left crankcase side cover mounting special bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)
Front engine hanger bolt (engine side)	59 N·m (6.0 kgf·m, 43 lbf·ft)
Front engine hanger bolt (frame side)	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear upper engine hanger plate bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear upper engine hanger bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear lower engine hanger bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Gearshift pedal pivot bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Gearshift pedal link pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)

DRIVE SPROCKET REMOVAL

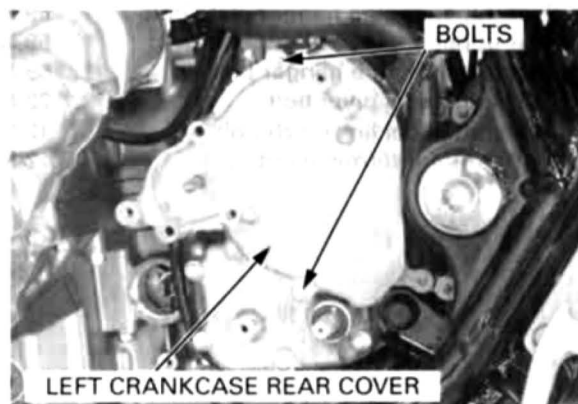
Remove the pinch bolt and then remove the gearshift pedal link from the gearshift spindle.



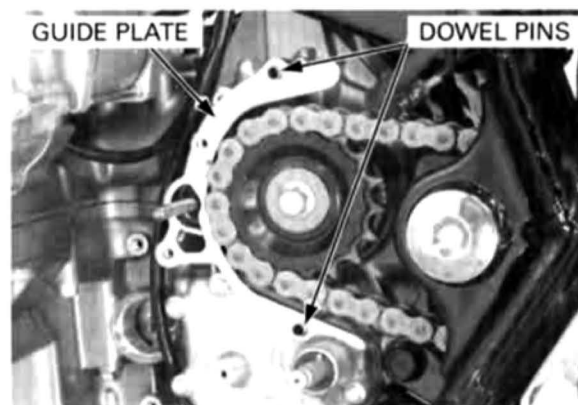
Remove the bolts and left crankcase side cover.



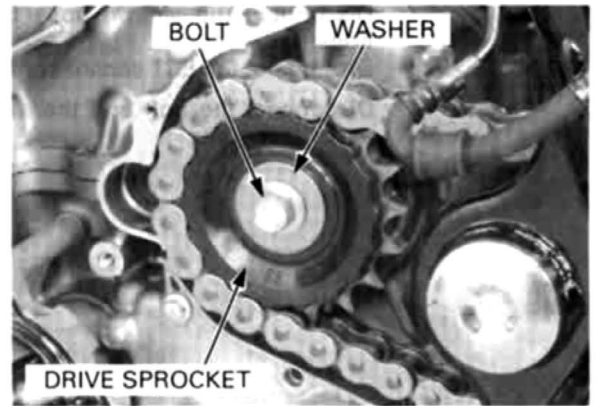
Remove the clutch slave cylinder (page 10-13).
Remove the water pump assembly (page 7-15).
Remove the bolts and left crankcase rear cover.



Remove the drive chain guide plate and dowel pins.



Remove the bolt, washer and drive sprocket.

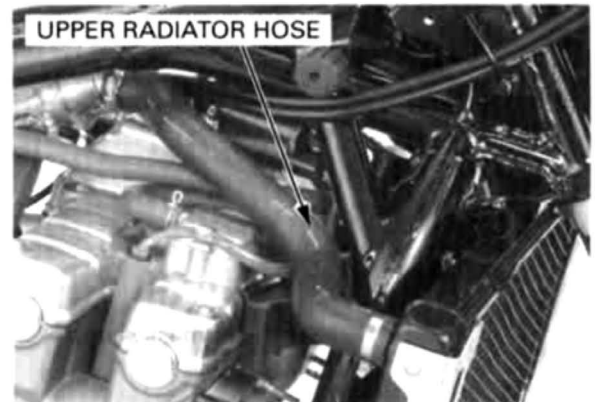


ENGINE REMOVAL

Remove the following:

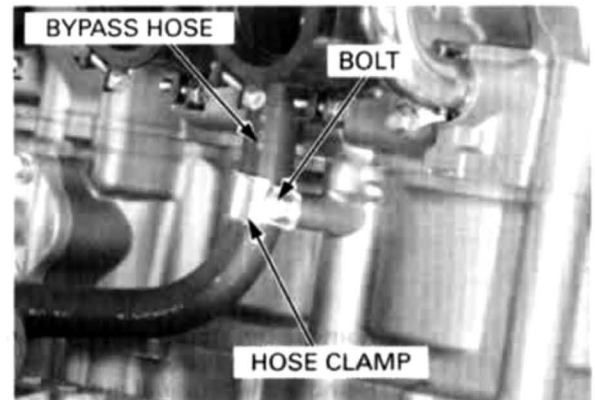
- Fuel tank (page 6-48)
- Throttle body (page 6-57)
- Muffler/exhaust pipe (page 3-12)
- Radiator (page 7-10)
- Oil cooler (page 5-14)
- Ignition coil (page 17-7)
- PAIR solenoid valve (page 6-86)
- Drive sprocket (page 8-4)

Disconnect the upper radiator hose from the radiator.

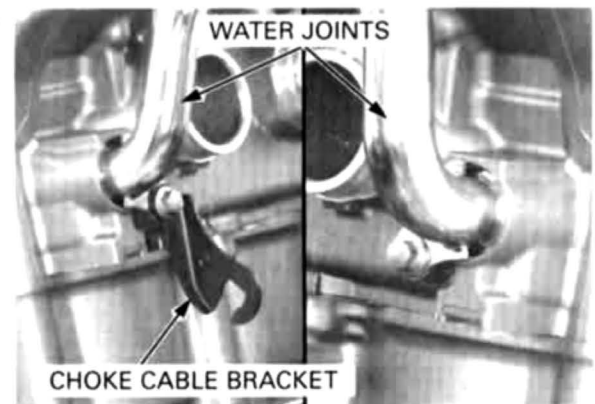


Remove the bolt and bypass hose clamp from the cylinder.

Remove the bypass hose between the insulators.



Remove the bolts, water joints and choke cable bracket from the cylinder head.

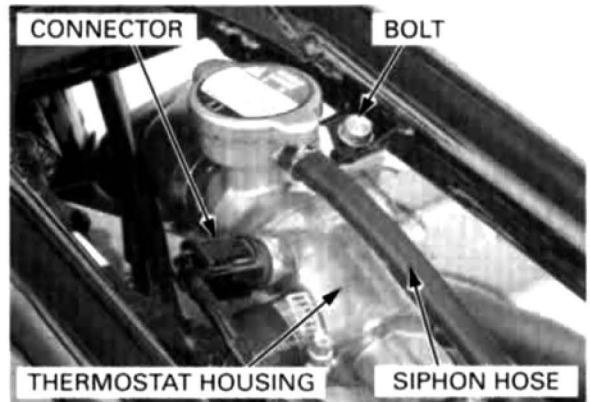


ENGINE REMOVAL/INSTALLATION

Disconnect the siphon hose from the thermostat housing.

Disconnect the ECT sensor connector.

Disconnect the bolt and thermostat housing/hoses as an assembly.



Remove the heat guard rubber from the cylinder head.

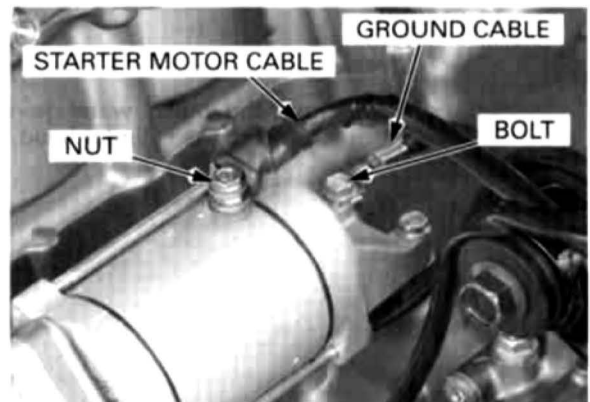


Release the harness clamp.

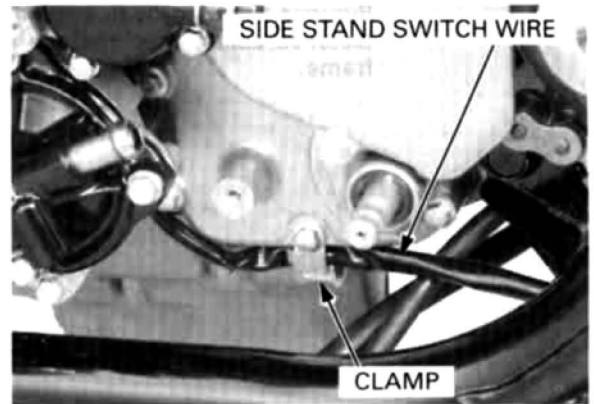


Remove the starter motor mounting bolt and starter motor ground cable.

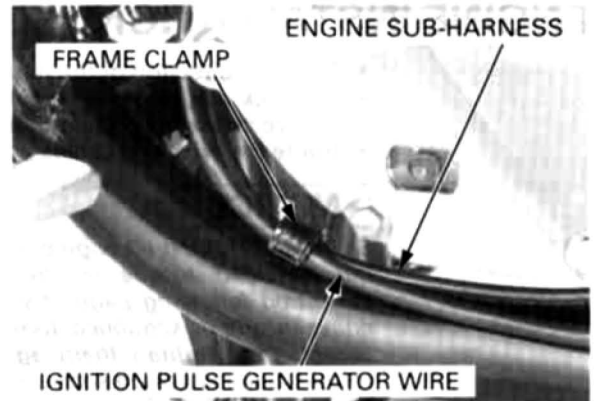
Remove the terminal nut and starter motor cable.



Release the side stand switch wire from the gear-shift linkage cover.



Release the engine sub-harness and ignition pulse generator wire from the frame clamp.



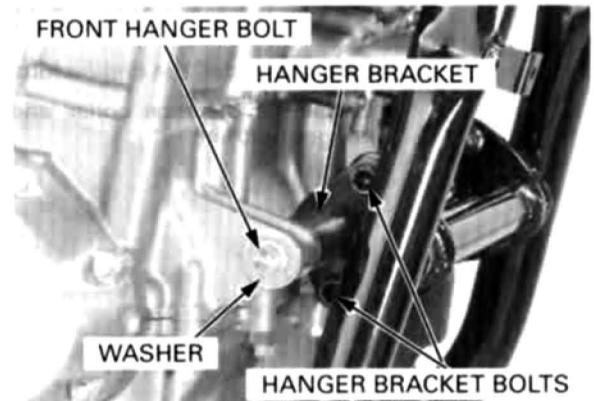
For ease of engine removal, remove the following items before removing the engine:

- Oil pan, oil strainer and oil pipes (page 5-6)
- Cylinder head cover (page 9-7)

Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

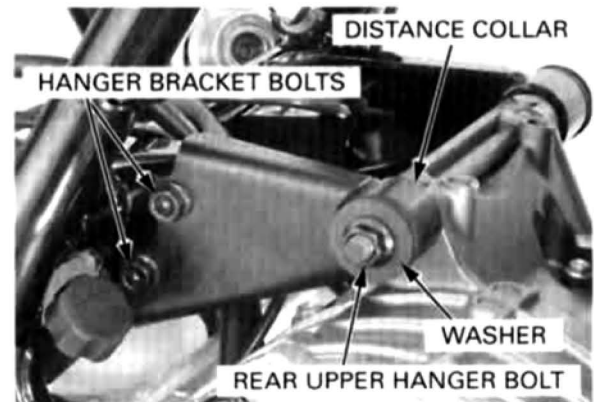
Remove the front engine hanger bolts/nuts and washers.

Remove the nuts, bolts and front engine hanger brackets.



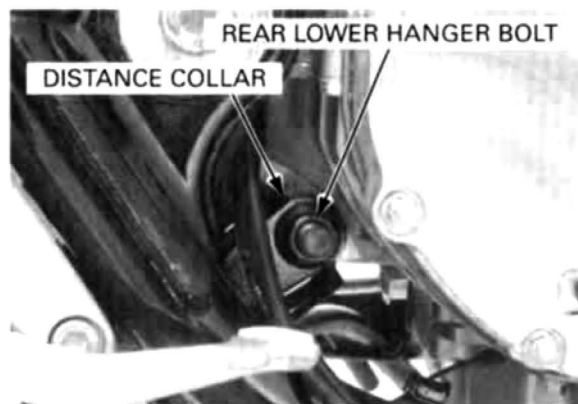
Remove the rear upper engine hanger bolt/nut and special washers.

Remove the bolts and rear upper engine hanger plate.



ENGINE REMOVAL/INSTALLATION

Remove the rear lower engine hanger bolt/nut and distance collar, then remove the engine from the frame.



ENGINE INSTALLATION

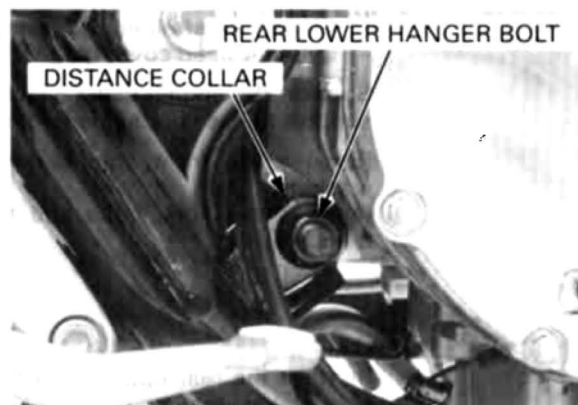
- Note the direction of the hanger bolts.
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-23).

NOTICE

Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described following page. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

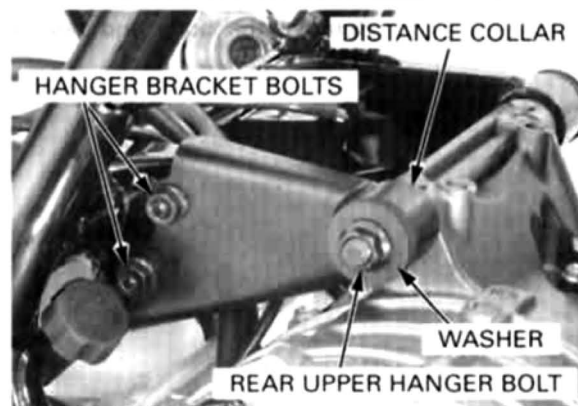
Carefully install the engine into the frame.

Install the distance collar and rear lower engine hanger bolt/nut.



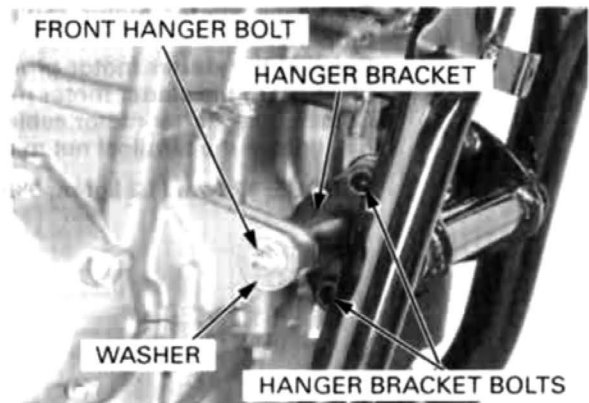
Install the rear upper engine hanger plate and bolt.

Install the rear upper engine hanger special washer, hanger bolt and nut.



Install the front engine hanger brackets, mounting bolts and nuts.

Install the front engine hanger washers, bolts and nuts.



First tighten the front engine hanger plate bolts and nuts to the specified torque.

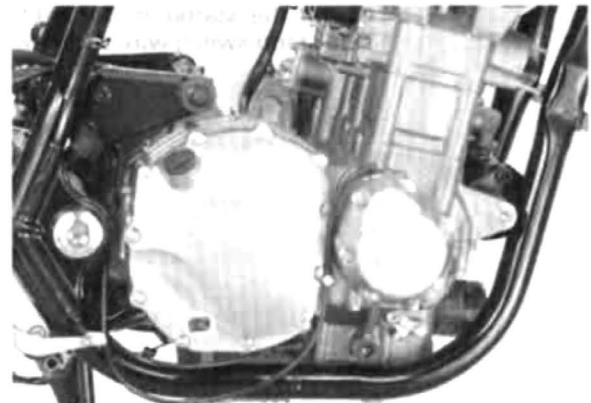
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the rear upper engine hanger plate bolt to the specified torque.

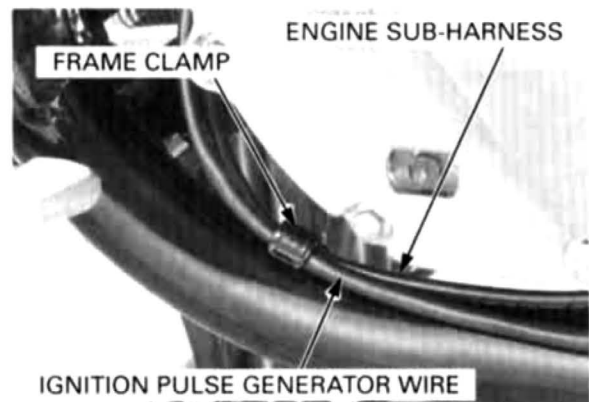
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Remove the engine support, then tighten all engine hanger bolt/nut to the specified torque.

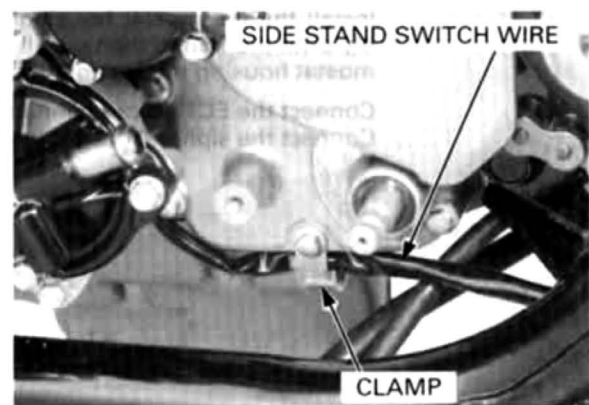
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Route the engine sub-harness and ignition pulse generator wire properly, clamp them with wire clamp.



Route the side stand switch wire properly, clamp it wire clamp on the gearshift linkage cover.

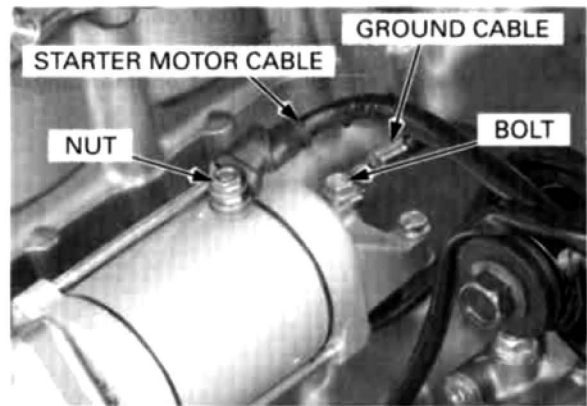


ENGINE REMOVAL/INSTALLATION

Route the starter motor cable and ground cable properly.

Connect the starter motor ground cable and install and tighten the starter motor mounting bolt. Connect the starter motor cable to the motor terminal, tighten the terminal nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clamp the starter motor cable, ground cable and side stand switch wire with a wire clamp.



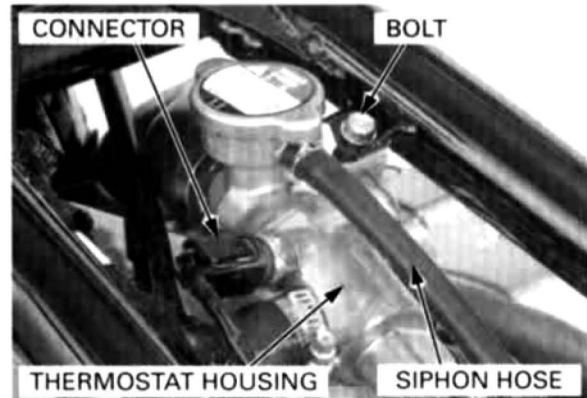
Install the heat insulate rubber onto the cylinder head cover and frame.



Install the thermostat housing/water hoses assembly onto the frame, then install and tighten the thermostat housing mounting bolts.

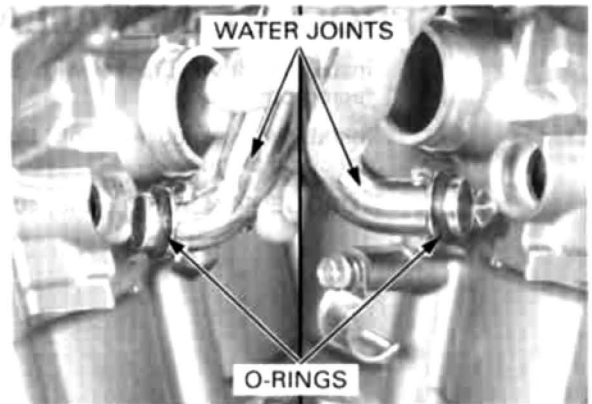
Connect the ECT sensor connector.

Connect the siphon hose to the filler neck.

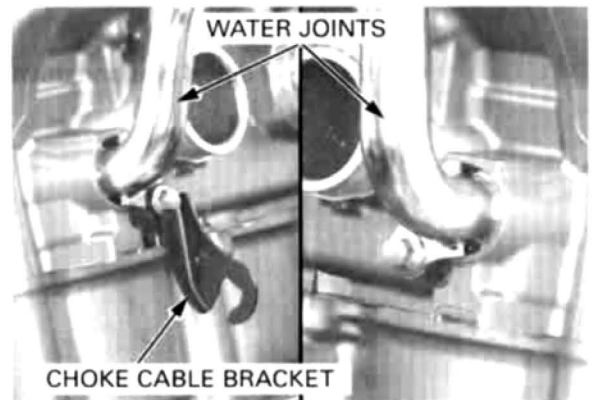


Install new O-rings onto the flange of the water joints.

Install the water joint to the cylinder head.

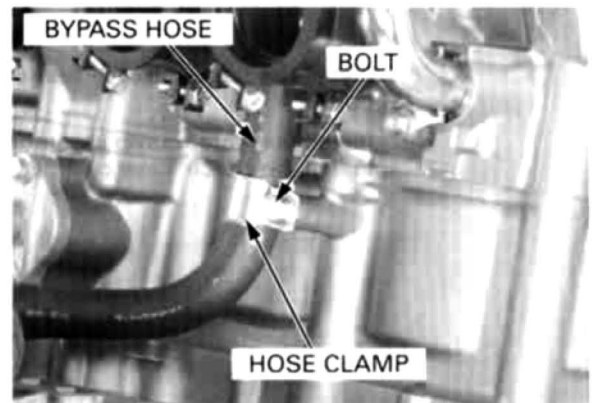


For the left water joint, install the choke bracket.
Install and tighten the water joint mounting bolt securely.



Route the bypass hose between the No.3 and No.4 insulator.

Install the water hose clamp and tighten the bolt.



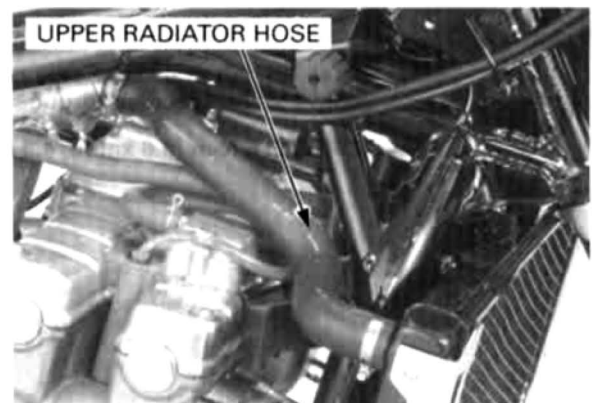
Connect the upper radiator hose to the radiator and tighten the hose band screw securely.

Install the following:

- Drive sprocket (page 8-12)
- PAIR solenoid valve (page 6-86)
- Ignition coil (page 17-7)
- Oil cooler (page 5-14)
- Radiator (page 7-14)
- Muffler/exhaust pipe (page 3-12)
- Throttle body (page 6-63)
- Fuel tank (page 6-48)

Pour recommended engine oil up to the proper level (page 4-14).

Fill the cooling system with recommended coolant and bleed the air (page 7-6).

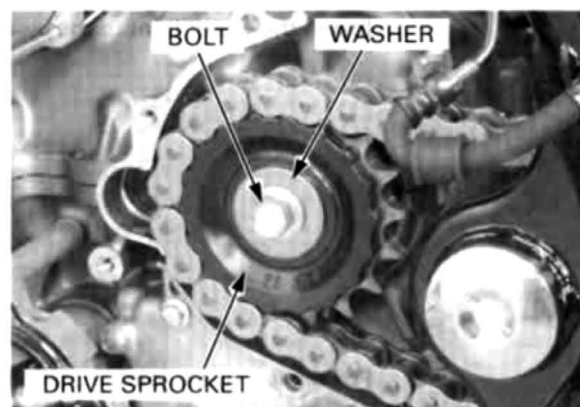


DRIVE SPROCKET INSTALLATION

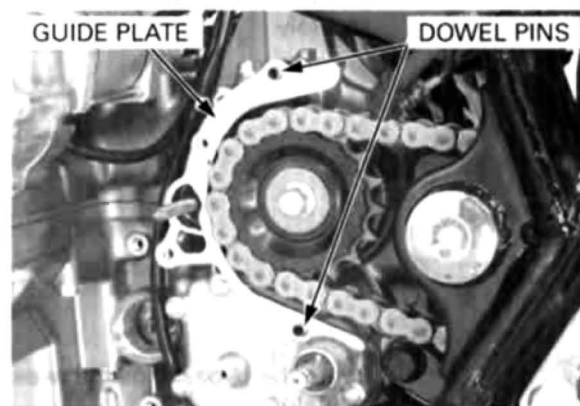
Install the drive sprocket with its teeth number mark facing out.

Install the washer and bolt, tighten the bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

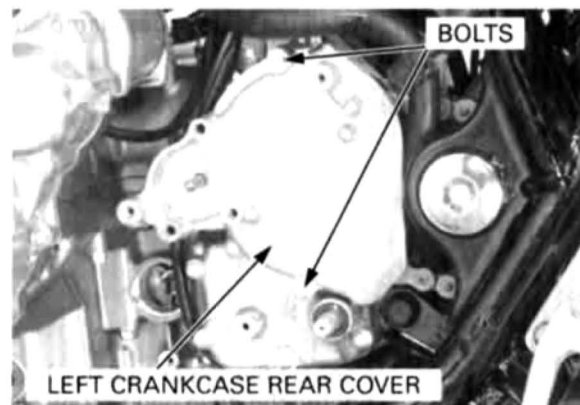


Install the dowel pins and drive chain guide plate.



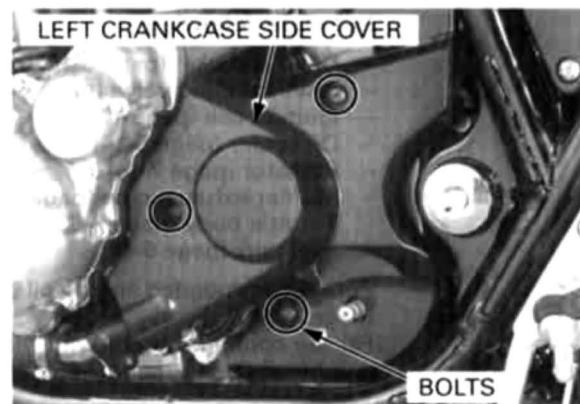
Install the left crankcase rear cover and tighten the bolts.

Install the water pump assembly (page 7-16).
Install the clutch slave cylinder (page 10-14).



Install the left crankcase side cover and tighten the screws to the specified torque.

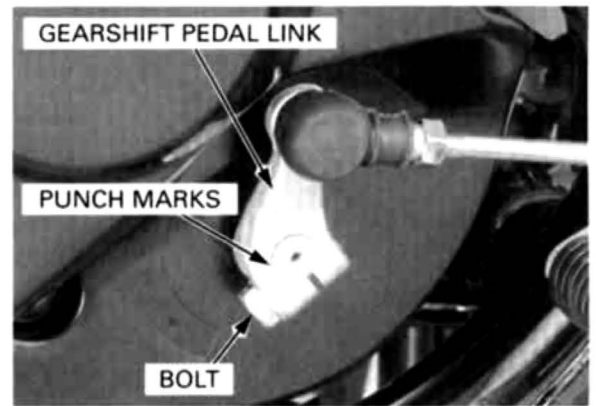
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



Install the gearshift pedal link to the gearshift spindle while aligning the punch marks.

Install and tighten the pinch bolt to the specified torque.

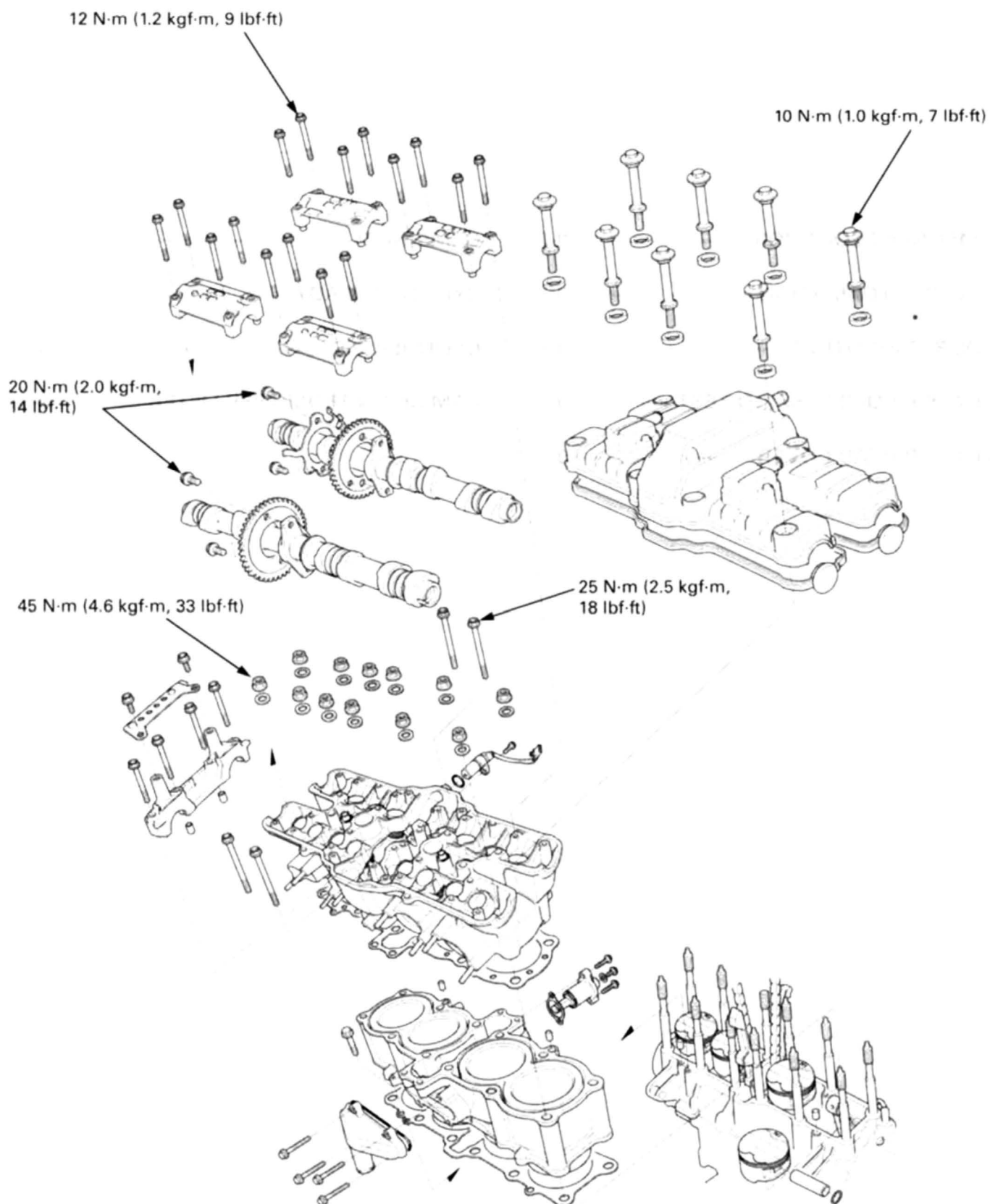
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



9. CYLINDER HEAD/CYLINDER/PISTON

COMPONENT LOCATION	9-2	CAMSHAFT	9-12
SERVICE INFORMATION	9-3	CYLINDER HEAD	9-20
TROUBLESHOOTING	9-6	CYLINDER/PISTON	9-31
CYLINDER COMPRESSION TEST	9-7	CAM CHAIN TENSIONER LIFTER	9-37
CYLINDER HEAD COVER	9-7		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, cylinder and piston.
- The camshaft, cylinder head and piston services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head and cylinder. Clean the oil passages before assembling cylinder head and cylinder.
- Be careful not to damage the mating surfaces when removing the cylinder head cover, cylinder head and cylinder.

SPECIFICATIONS



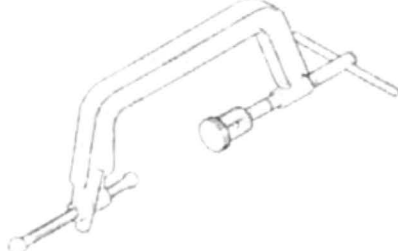






ITEM				STANDARD	SERVICE LIMIT
Cylinder compression				1,324 kPa (13.5 kgf/cm ² , 192 psi) at 240 min ⁻¹ (rpm)	-
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	-	
		EX	0.22 ± 0.03 (0.009 ± 0.001)	-	
Camshaft	Cam lobe height	IN	37.54 – 37.78 (1.4779 – 1.4874)	37.50 (1.476)	
		EX	37.40 – 37.64 (1.4724 – 1.4818)	37.36 (1.471)	
	Runout	-	0.05 (0.002)		
	Oil clearance	0.030 – 0.072 (0.0012 – 0.0028)	0.10 (0.004)		
Valve lifter	Valve lifter O.D.	25.978 – 25.993 (1.0228 – 1.0233)		25.97 (1.022)	
	Valve lifter bore I.D.	26.010 – 26.026 (1.0240 – 1.0246)		26.04 (1.025)	
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)	
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)	
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)	
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	-	
		EX	0.025 – 0.052 (0.0010 – 0.0020)	-	
	Valve guide projection above cylinder head	IN	15.6 – 15.8 (0.61 – 0.62)	-	
		EX	15.6 – 15.8 (0.61 – 0.62)	-	
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)	
Valve spring free length		IN	44.85 (1.766)	43.95 (1.730)	
		EX	44.85 (1.766)	43.95 (1.730)	
Cylinder head warpage				-	0.10 (0.004)
Piston, piston rings	Piston O.D. at 15 (0.6) from bottom		77.970 – 77.990 (3.0697 – 3.0705)	77.87 (3.066)	
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.06 (0.750)	
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.98 (0.747)	
	Piston -to piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)	
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.58 (0.023)	
		Sec- ond	0.32 – 0.47 (0.013 – 0.019)	0.65 (0.026)	
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.026)	0.85 (0.033)	
	Piston ring-to-ring groove clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)	
Sec- ond		0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)		
Cylinder	I.D.		78.000 – 78.015 (3.0709 – 3.0715)	78.10 (3.075)	
	Out of round		-	0.05 (0.002)	
	Taper		-	0.05 (0.002)	
	Warpage		-	0.05 (0.002)	
Cylinder-to piston clearance				0.010 – 0.045 (0.0004 – 0.0018)	-
Connecting rod small end I.D.				19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance				0.030 – 0.057 (0.0012 – 0.0022)	-

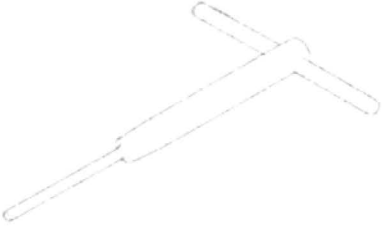





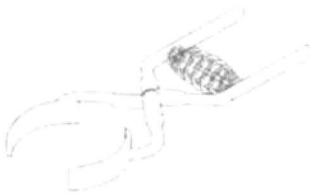
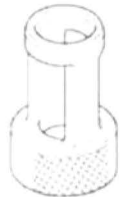
CYLINDER HEAD/CYLINDER/PISTON

TORQUE VALUES

Cylinder head mounting flange nut	45 N·m (4.6 kgf·m, 33 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head mounting flange bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head sealing bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	Apply a locking agent to the threads
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	CT bolt
PAIR reed valve cover SH bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Intake cam sprocket/cam pulse generator rotor UBS bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	
Exhaust cam sprocket flange dowel bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Cam chain guide bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cylinder head stud bolt (exhaust pipe stud bolt)	See page 1-16	
Cylinder stud bolt	See page 1-15	

TOOLS

Valve guide remover, 5 mm 07942-MA60000 	Valve guide driver 07743-0020000 	Valve spring compressor 07757-0010000 
Flat cutter, 33 mm (IN 32°) 07780-0012900 	Flat cutter, 28 mm (EX 32°) 07780-0012100 	Seat cutter, 33 mm (IN 45°) 07780-0010800 
Seat cutter, 27.5 mm (EX 45°) 07780-0010200 	Interior cutter, 30 mm (IN 60°) 07780-0014000 	Interior cutter, 26 mm (EX 60°) 07780-0014500 

<p>Cutter holder, 5 mm 07781-0010400</p>  A technical drawing of a T-shaped cutter holder. It has a long, thin handle and a perpendicular crossbar with a central hole.	<p>Valve guide reamer 07984-MA60001</p>  A technical drawing of a long, thin, tapered tool with a handle at one end and a reamer tip at the other.	<p>Tappet hole protector 07HMG-MR70002</p>  A technical drawing of a cylindrical cup-like part with a flange at the top.
<p>Tensioner stopper 07NMG-MY90101</p>  A technical drawing of a small, irregularly shaped part with a central hole.	<p>Compression gauge 07RMJ-MY50100</p>  A technical drawing of a U-shaped gauge with two long, thin arms and a curved base. <p>or equivalent commercially available</p>	<p>Piston base 07958-2500001</p>  A technical drawing of a rectangular block with a U-shaped cutout in the center.
<p>Piston ring compressor 07PME-MZ20100</p>  A technical drawing of a pair of pliers with a coiled spring in the center.	<p>Valve spring compressor attachment 07959-KM30101</p>  A technical drawing of a cylindrical part with a flange at the bottom and a central hole.	

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring.

Compression too low, hard starting or poor performance at low speed

- Valves:
 - Incorrect valve adjustment
 - Burned or bent valve
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
- Cylinder head:
 - Leaking or damaged head gasket
 - Warped or cracked cylinder head
- Worn cylinder, piston or piston rings

Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

- Cylinder head:
 - Worn valve stem or valve guide
 - Damaged stem seal
- Cylinder, piston and piston ring:
 - Worn cylinder, piston or piston ring
 - Improper installation of piston rings
 - Scored or scratched piston or cylinder wall

Excessive noise

- Cylinder head:
 - Incorrect valve adjustment
 - Sticking valve or broken valve spring
 - Damaged or worn camshaft
 - Loose or worn cam chain
 - Worn or damaged cam chain
 - Worn or damaged cam chain tensioner
 - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings

Rough idle

- Low cylinder compression

Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings

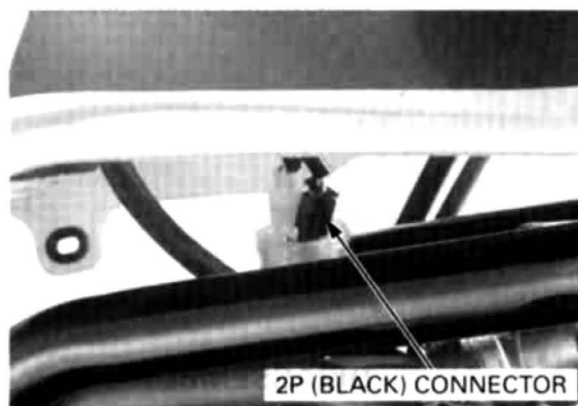
CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

Stop the engine and remove the all plug caps and spark plugs (page 4-8).

Open and support the front end of fuel tank (page 4-5).

Disconnect the fuel pump 2P (Black) connector.



Install a compression gauge into the spark plug hole.

TOOL:

Compression gauge

07RMJ-MY50100
(Equivalent commercially available)

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

The maximum reading is usually reached within 4 – 7 seconds.

Compression pressure:

1,324 kPa (13.5 kgf/cm², 192 psi) at 240 min⁻¹ (rpm)

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

To avoid discharging the battery, do not operate the starter motor for more than seven seconds.



CYLINDER HEAD COVER

REMOVAL

Remove the following:

- Thermostat housing (page 7-8)
- Ignition coil assembly (page 17-7)
- PAIR control valve assembly (page 6-86)

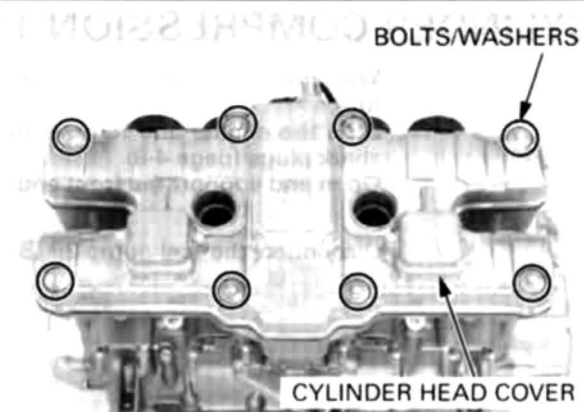
Remove the crankcase breather hose.



CYLINDER HEAD/CYLINDER/PISTON

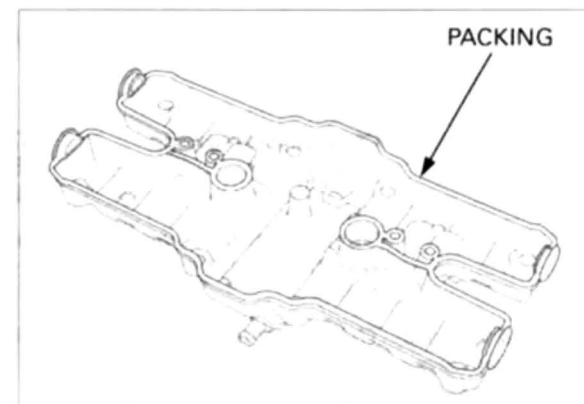
Remove the cylinder head cover bolts and washers.

Remove the cylinder head cover rearward.

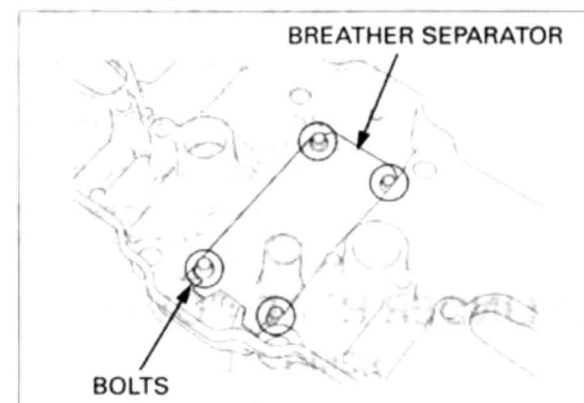


DISASSEMBLY

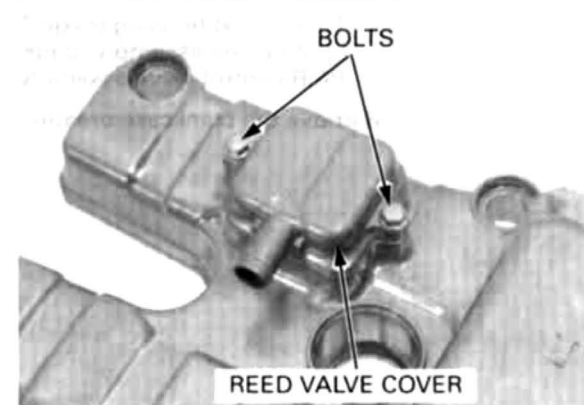
Remove the cylinder head cover packing.



Do not remove bolts and breather separator.

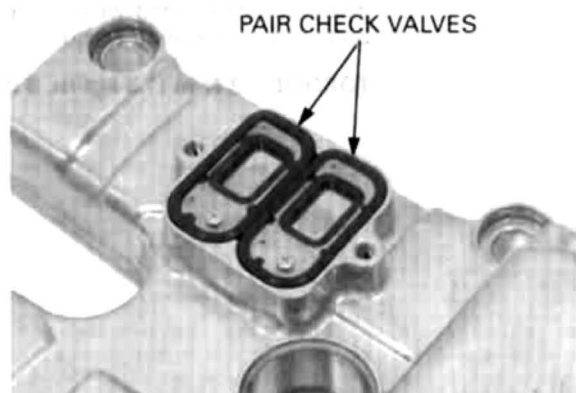


Remove bolts and PAIR reed valve cover.

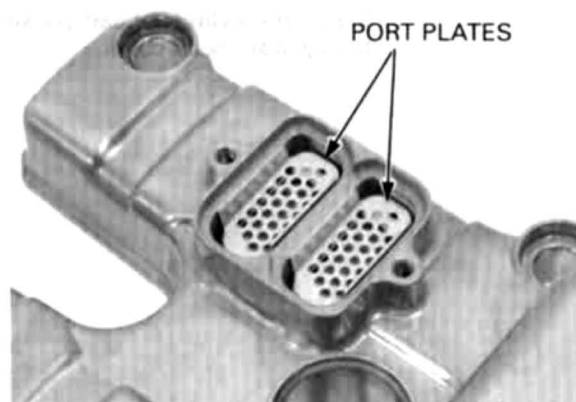


Remove the PAIR check valve.

Check the PAIR check valve for wear or damage, replace if necessary.

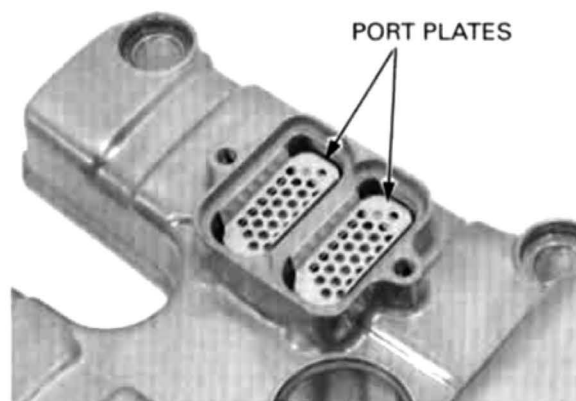


Remove the port plates from the cylinder head cover.

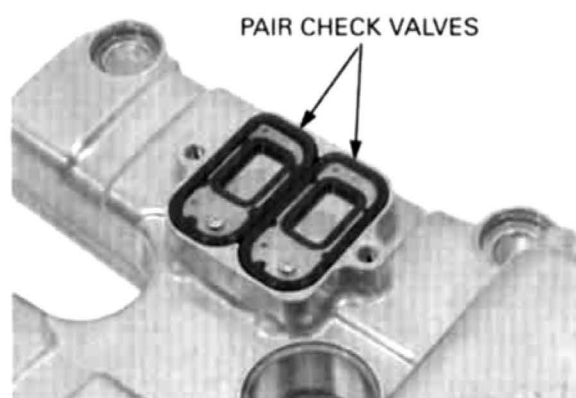


ASSEMBLY

Install the PAIR check valve port plates into the cylinder head cover.



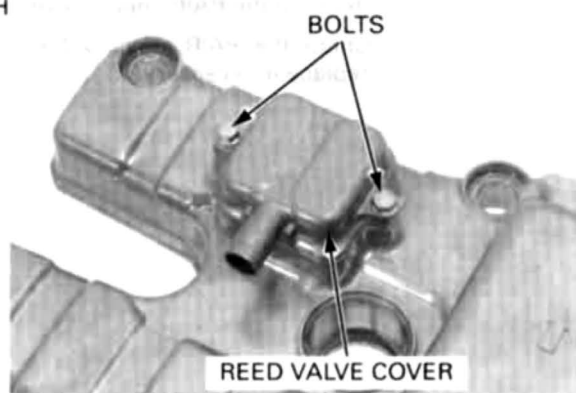
Install the PAIR check valves into the cylinder head cover.



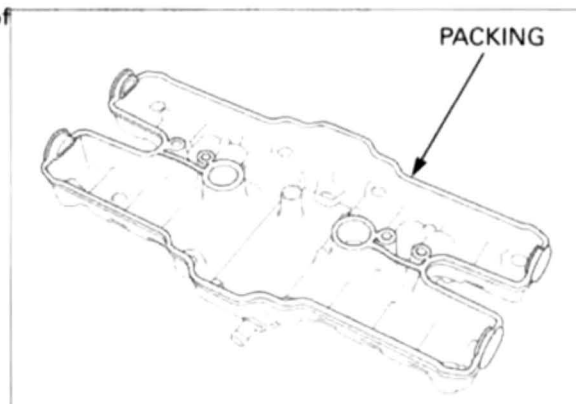
CYLINDER HEAD/CYLINDER/PISTON

Install the PAIR reed valve covers and tighten the SH bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

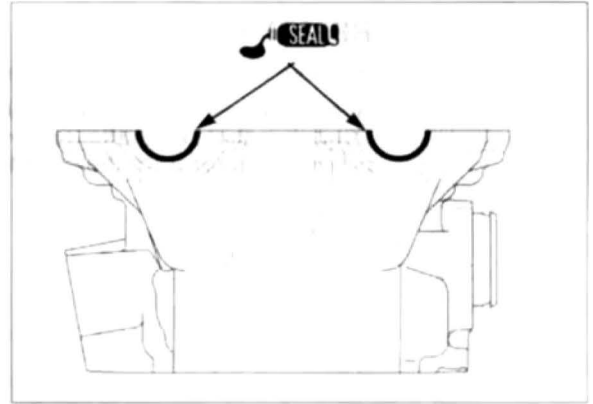


Install the cylinder head packing into the groove of the cylinder head cover.



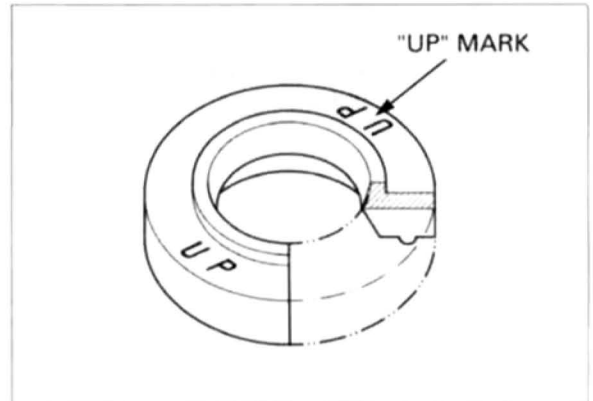
INSTALLATION

Apply sealant to the cylinder head semi-circular cut-outs as shown.



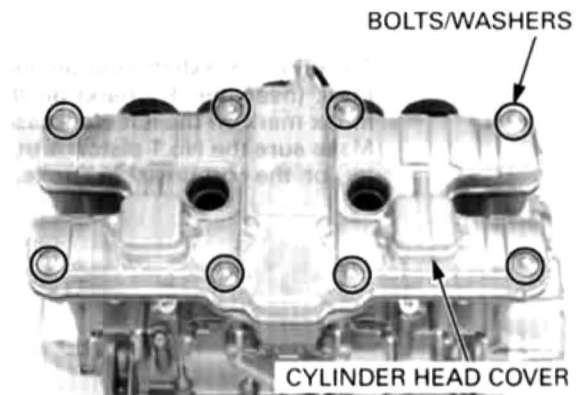
Install the cylinder head cover onto the cylinder head.

Install the washers with their "UP" mark facing up.



Install and tighten the cylinder head cover special bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the crankcase breather hose.

Install the following:

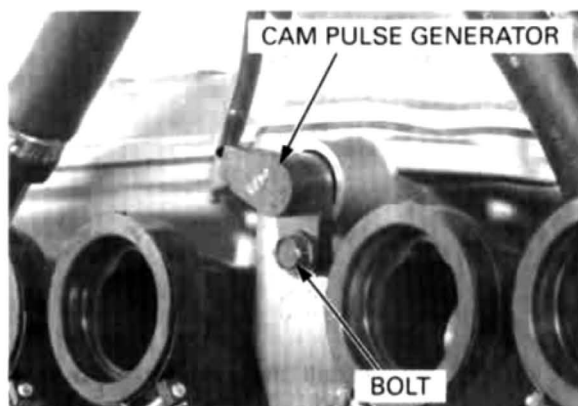
- Thermostat housing (page 7-9)
- Ignition coil assembly (page 17-7)
- PAIR control valve assembly (page 6-86)



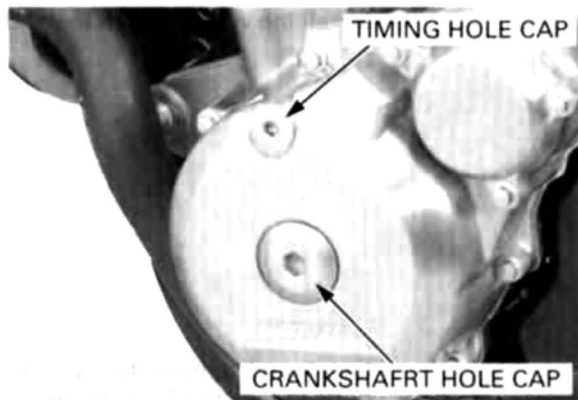
CAMSHAFT**REMOVAL**

Remove the cylinder head cover (page 9-7).

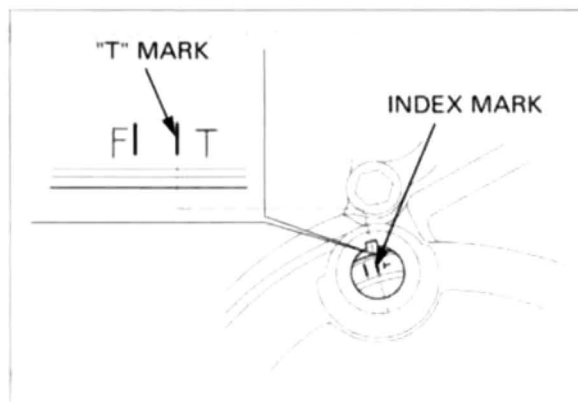
Avoid damaging the cam pulse generator while removing the camshafts, remove the bolt and cam pulse generator from the cylinder head.



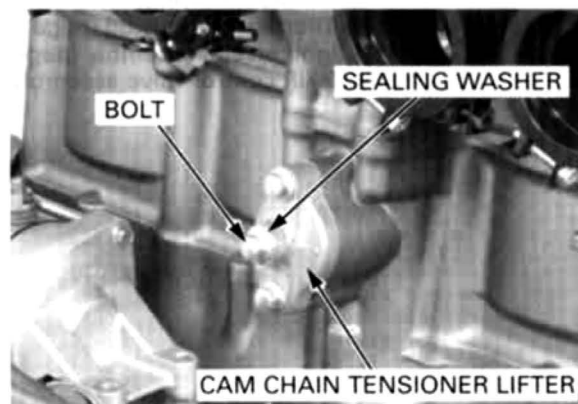
Remove the timing hole cap, crankshaft hole cap and O-ring.



Turn the crankshaft counterclockwise, align the "T" mark (near the "F" mark) on the flywheel with the index mark on the left crankcase cover. Make sure the No.1 piston is at TDC (Top Dead Center) on the compression stroke.



Remove the cam chain tensioner lifter sealing bolt and sealing washer.

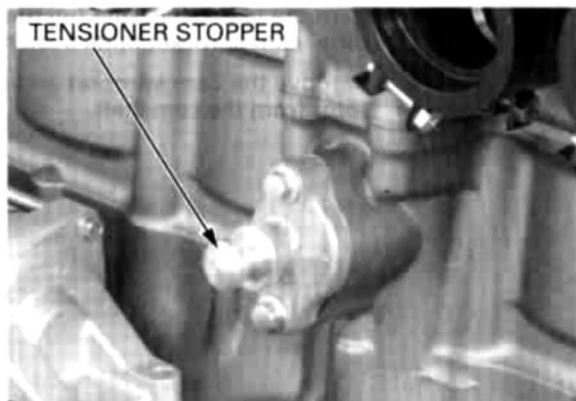


Turn the tensioner lifter shaft fully in (clockwise) and secure it using the stopper tool.

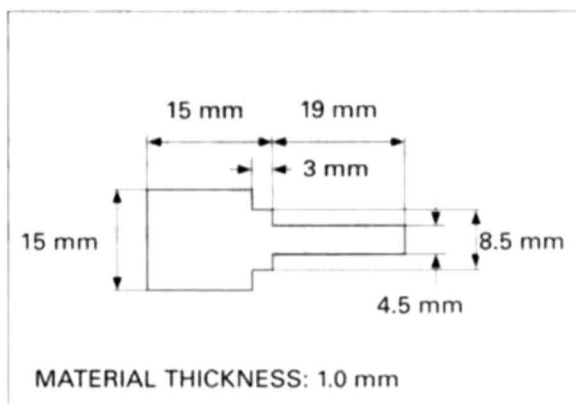
TOOL:

Tensioner stopper

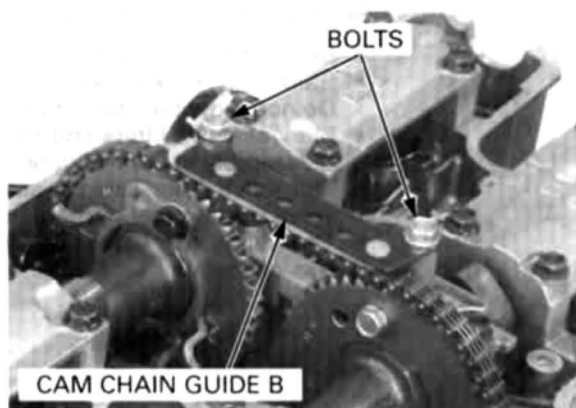
07NMG-MY90101



This tool can easily be made from a thin (1 mm thickness) piece of steel.

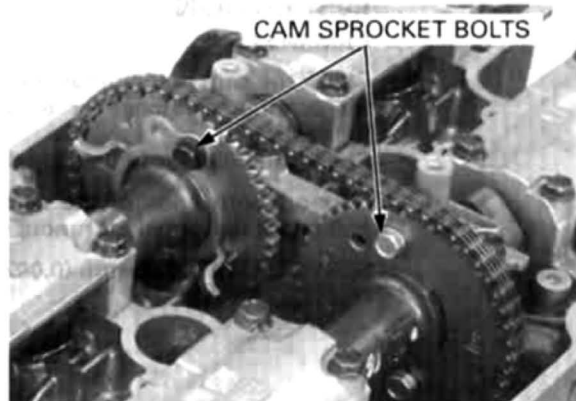


Remove the bolts and cam chain guide B.



Be careful not to drop the cam sprocket bolts into the crankcase.

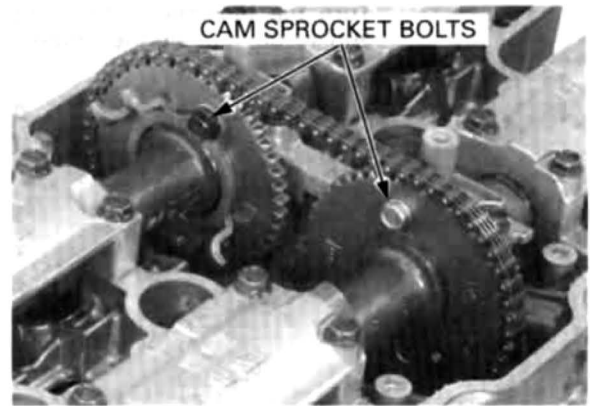
Remove the cam sprocket bolts from intake and exhaust camshafts.



CYLINDER HEAD/CYLINDER/PISTON

Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.

Remove the cam sprocket and cam pulse generator rotor from the camshaft.



Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

Loosen and remove the camshaft holder bolts, then remove the camshaft holders and camshaft.

NOTICE

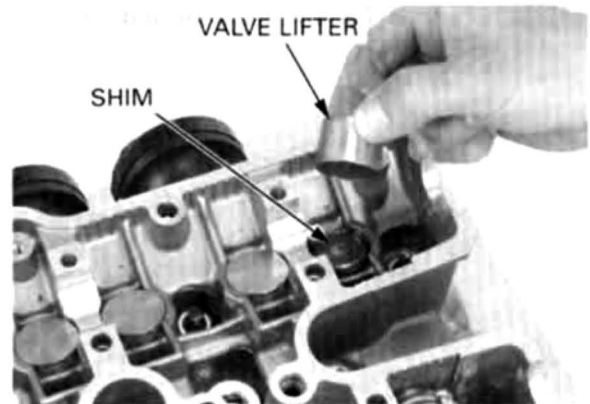
From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.

Do not forcibly remove the dowel pins from the camshaft holder.



Remove the valve lifters and shims.

- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.



INSPECTION

CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.

Check the oil holes in the camshaft for clogging.

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)

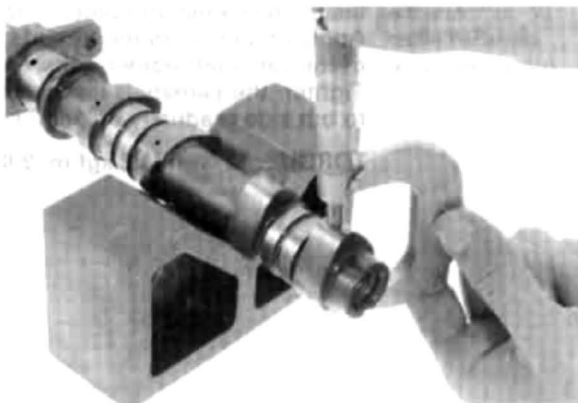


Using a micrometer, measure each cam lobe height.

SERVICE LIMITS:

IN: 37.50 mm (1.476 in)

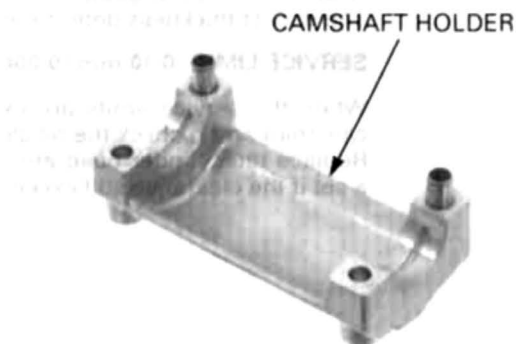
EX: 37.36 mm (1.471 in)



CAMSHAFT HOLDER

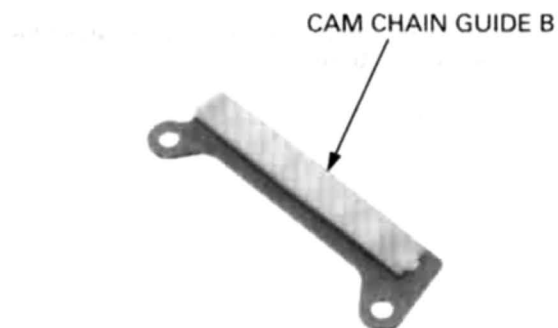
Inspect the bearing surface of camshaft holder for scoring, scratches, or evidence of insufficient lubrication.

Inspect the oil orifices of the holders for clogging.



CAM CHAIN GUIDE B

Inspect the cam chain slipper surface of the cam chain guide for wear or damage.

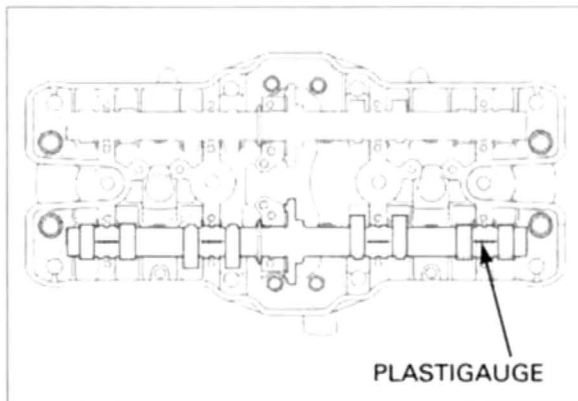


CAMSHAFT OIL CLEARANCE

Remove the cylinder head and valves (page 9-20).

Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.

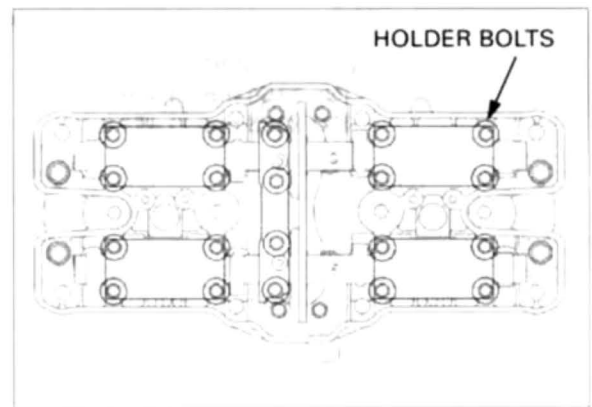


CYLINDER HEAD/CYLINDER/PISTON

Do not rotate the camshaft when using plastigauge

Install the camshaft holder onto the camshafts.
Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.
Tighten the camshaft holder bolts in a from inside to out side gradually in 2 or 3 steps.

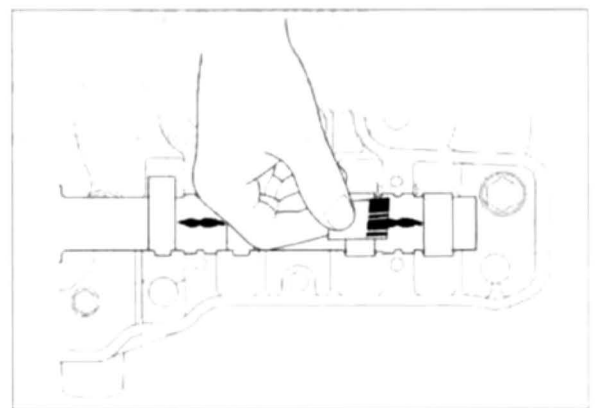
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.

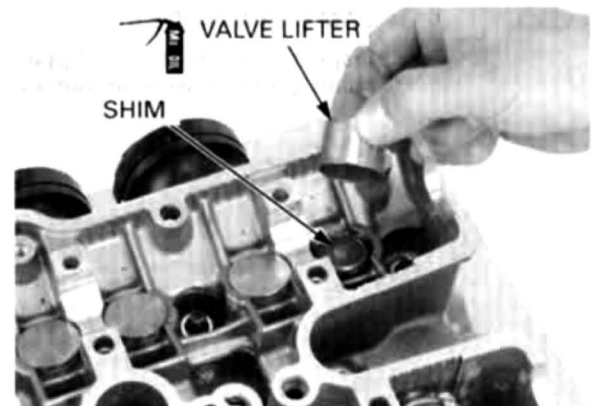


INSTALLATION

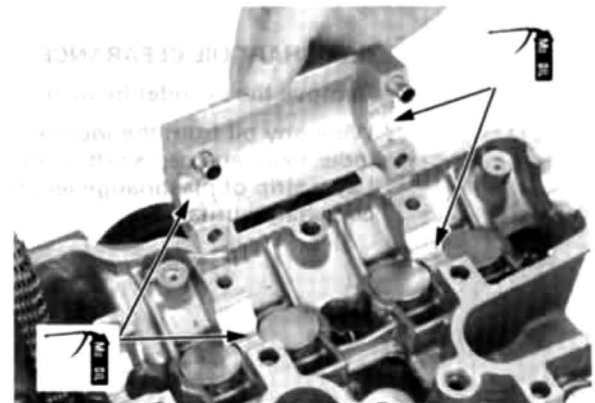
Apply molybdenum oil solution to the outer surface of the each valve lifter.

Install the shims and valve lifters in their original locations.

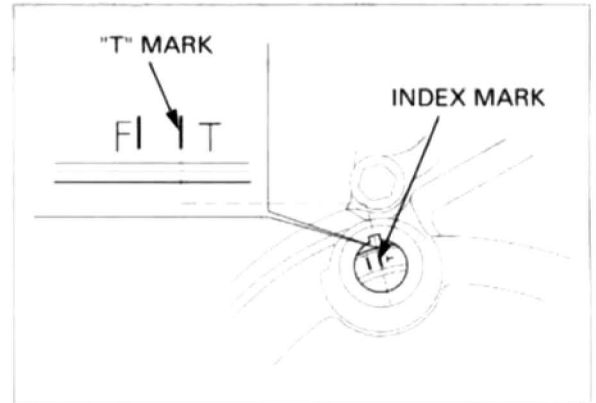
Install the shims and valve lifters into the valve lifter bores.



Apply molybdenum oil solution to the camshaft journals of the cylinder head and camshaft holder.



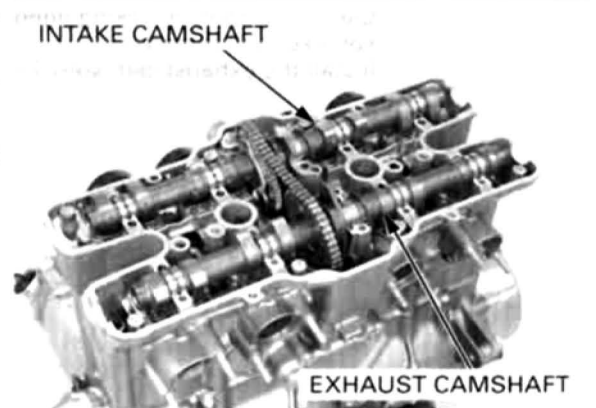
Turn the crankshaft counterclockwise and align the "T" mark (near the "F" mark) on the flywheel with the index mark on the left crankcase cover.



Install the cam sprockets and cam pulse generator rotor onto the each camshaft.

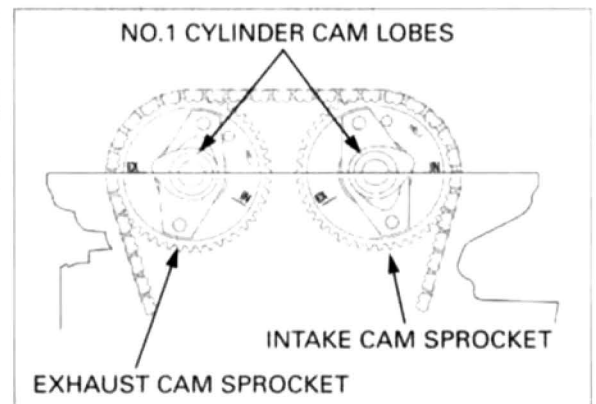
Install the intake and exhaust camshafts onto the cylinder head.

- Install the each camshaft to the correct locations with the identification marks.
"IN": Intake camshaft
"EX": Exhaust camshaft

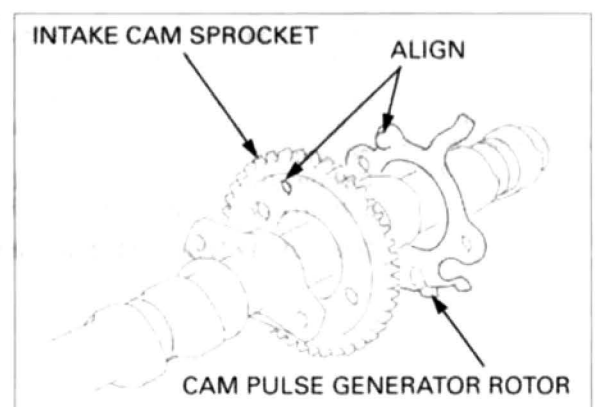


Install the cam chain over the sprockets and then install the cam sprockets onto the camshaft flanges.

- Install the intake cam sprocket with the timing mark (IN) facing outward and the No.1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No.1 cam lobes facing up and out as shown.



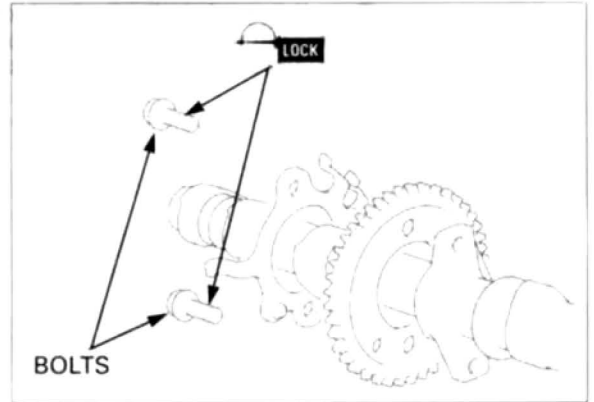
Install the cam pulse generator rotor while aligning its boss with the intake cam sprocket hole.



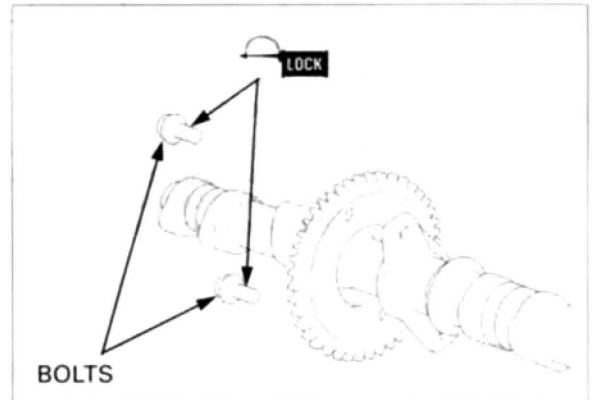
CYLINDER HEAD/CYLINDER/PISTON

The intake cam sprocket bolts (black color) are longer than the exhaust cam sprocket bolts.

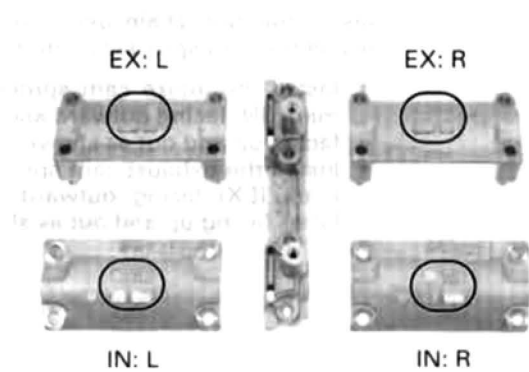
Clean and apply a locking agent to the intake cam sprocket bolt threads.
Install the intake cam sprocket bolts.



Clean and apply a locking agent to the exhaust cam sprocket bolt threads.
Install the exhaust cam sprocket bolts.



Install the camshaft holder onto the camshafts.



Be sure the dowel pins in the camshaft holder align properly with the holes in the cylinder head.

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.

From inside to outside tighten the camshaft holder bolts gradually until the camshaft holders seats the cylinder head.

Tighten the camshaft holder bolts in a crisscross pattern in 2-3 steps to the specified torque.

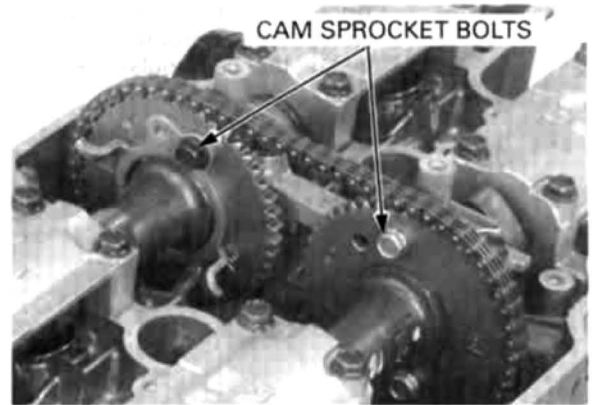
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



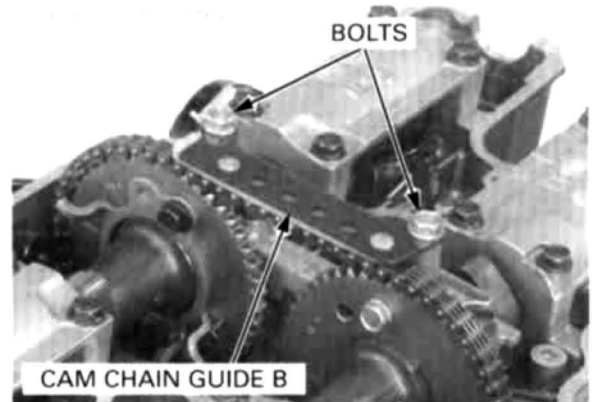
In case the cam sprockets were removed, tighten the cam sprocket bolts to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

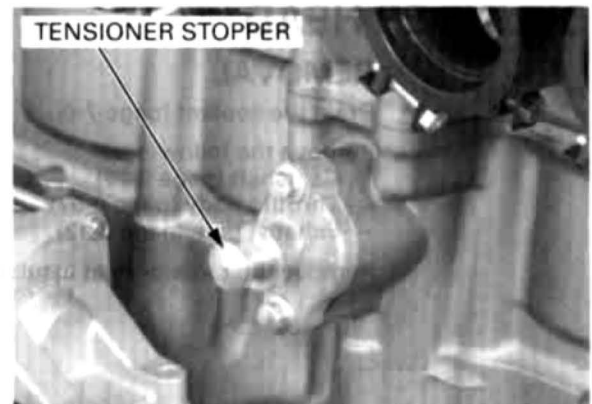
Turn the crankshaft counterclockwise one full turn (360°) and tighten the other cam sprocket bolts.



Install the cam chain guide B, and tighten the bolts.

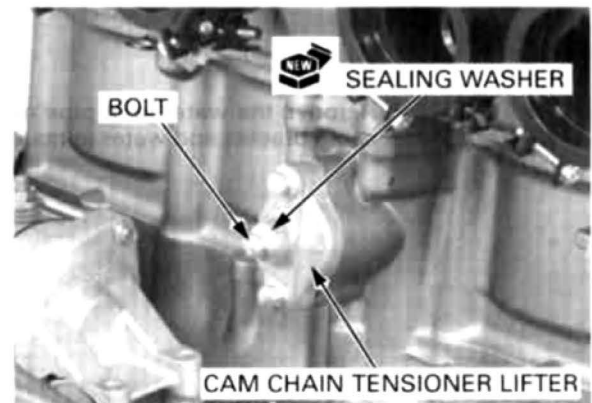


Remove the stopper tool from the cam chain tensioner lifter.



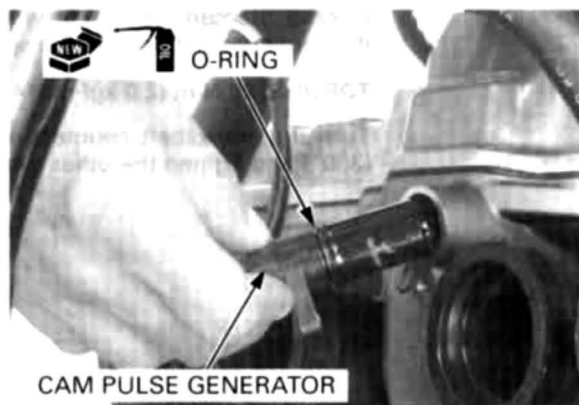
Install a new sealing washer and tighten the sealing bolt.

Recheck the valve timing.

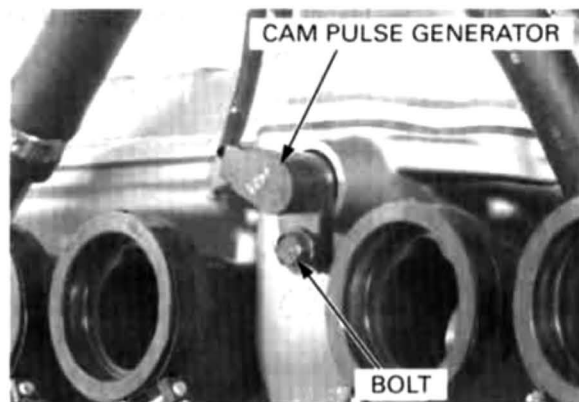


CYLINDER HEAD/CYLINDER/PISTON

Apply oil to the new O-ring, and install it onto the cam pulse generator.
Install the cam pulse generator into the cylinder head.



Install and tighten the mounting bolt securely.



CYLINDER HEAD

REMOVAL

Drain the coolant (page 7-6).

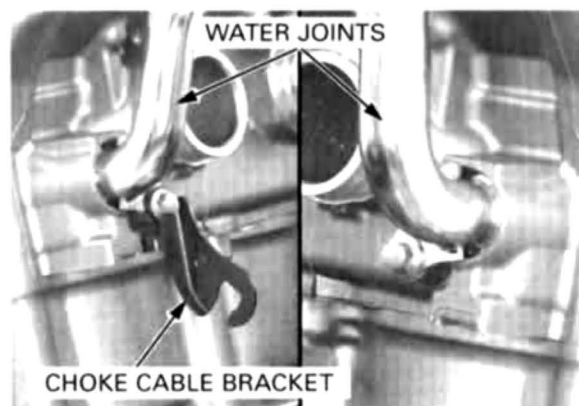
Remove the following:

- Camshaft (page 9-12)
- Throttle body (page 6-57)
- Exhaust pipe (page 3-12)

Remove the radiator heat insulator.



Remove the water joint pipe mounting bolts, choke cable bracket and water joints.



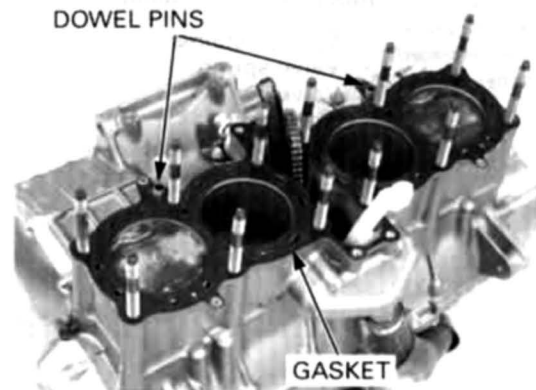
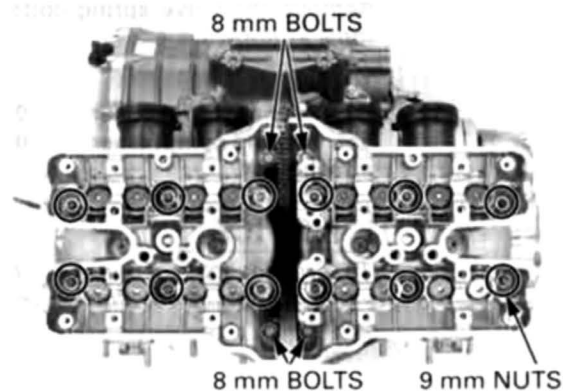
Remove the four 8 mm flange bolts.

Loosen the 9 mm nuts in a crisscross pattern in 2 - 3 steps.

Remove the ten 9 mm nuts and sealing washers.

Remove the cylinder head.

Remove the gasket and dowel pins.



DISASSEMBLY

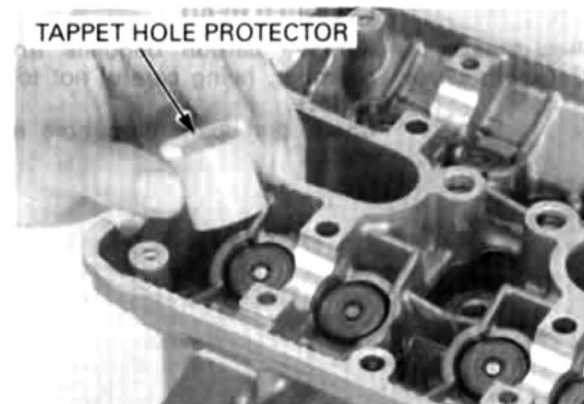
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

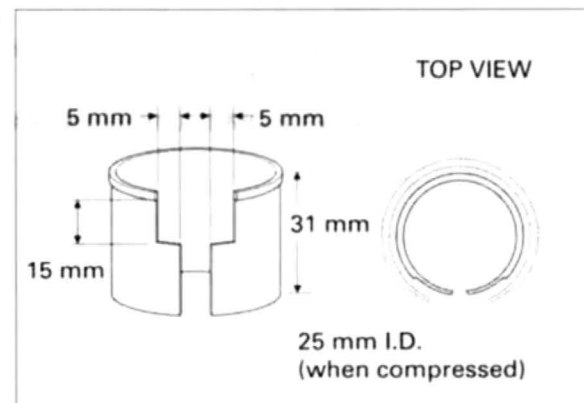
TOOL:

Tappet hole protector

07HMG-MR70002



An equivalent tool can easily be made from a plastic 35 mm film container as shown.



CYLINDER HEAD/CYLINDER/PISTON

Remove the valve spring cotters using the special tools as shown.

TOOLS:

Valve spring compressor 07757-0010000
Valve spring compressor attachment 07959-KM30101

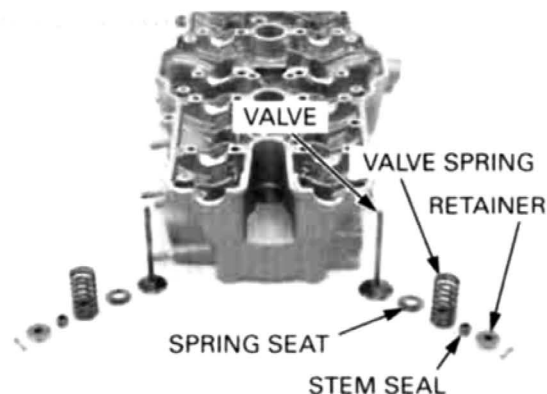
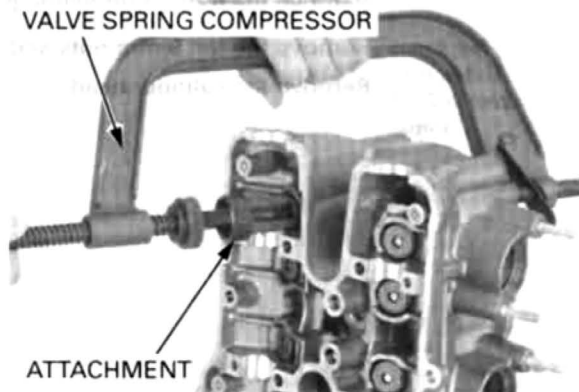
NOTICE

To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

Mark all parts during disassembly so they can be placed back in their original locations.

Remove the following:

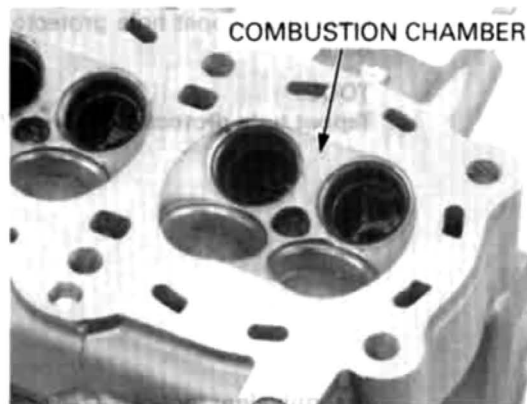
- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat



INSPECTION CYLINDER HEAD

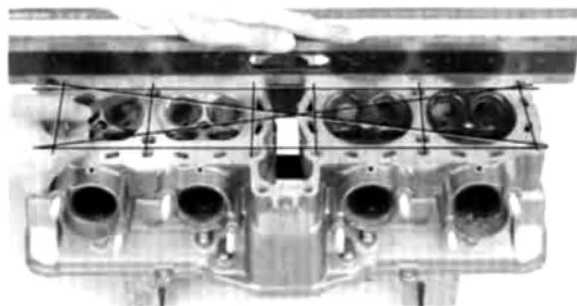
Avoid damaging the gasket surface.

Remove carbon deposits from the combustion chamber, being careful not to damage the gasket surface. Check the spark plug hole and valve areas for cracks.



Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

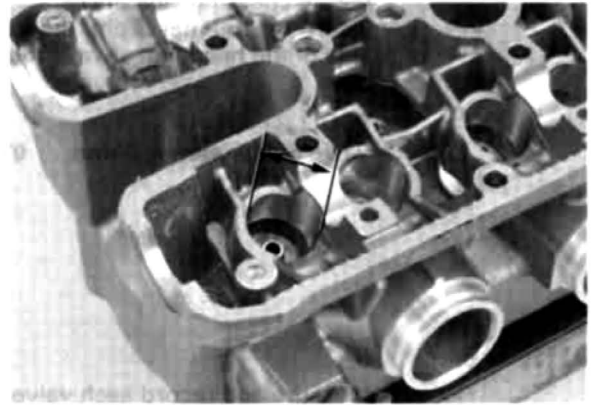


VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.

Measure the each valve lifter bore I.D.

SERVICE LIMIT: 26.04 mm (1.025 in)

**VALVE LIFTER**

Inspect each valve lifter for scratches or abnormal wear.

Measure the each valve lifter O.D.

SERVICE LIMIT: 25.97 mm (1.022 in)

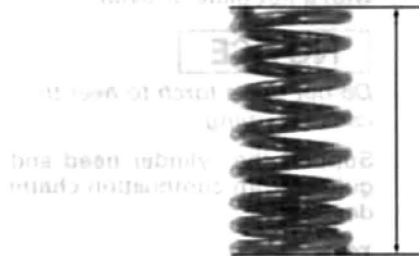
**VALVE SPRING**

Measure the valve spring free length.

SERVICE LIMIT:

IN/EX: 43.95 mm (1.730 in)

Replace the springs if they are shorter than the service limits.

**VALVE/VALVE GUIDE**

Check that the valve moves smoothly in the guide.

Inspect each valve for bending, burning or abnormal stem wear.

Check valve movement in the guide, measure and record each valve stem O.D.

SERVICE LIMIT:

IN: 4.965 mm (0.1955 in)

EX: 4.950 mm (0.1949 in)

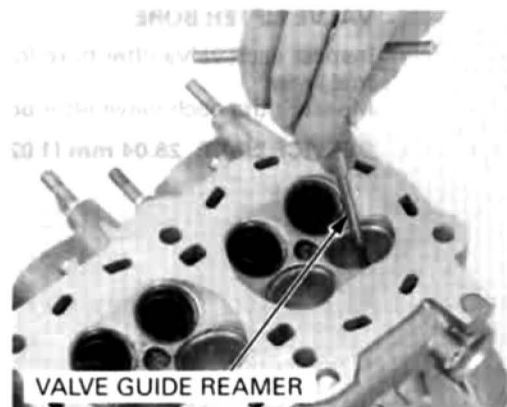


Ream the guides to remove any carbon deposits before checking clearances.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5 mm 07984-MA60001



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 5.040 mm (0.1984 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

STANDARD:

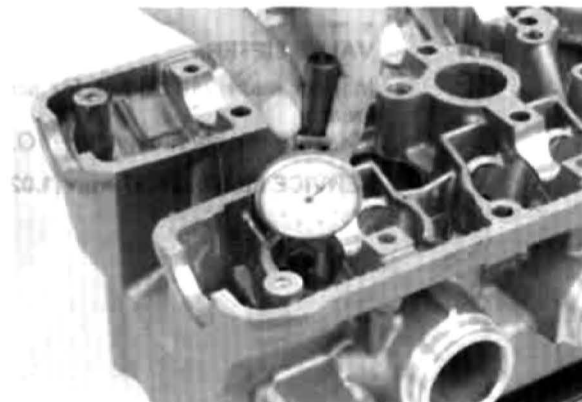
IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)

EX: 0.025 – 0.052 mm (0.0010 – 0.0020 in)

Reface the valve seats whenever the valve guides are replaced (page 9-26).

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.



VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

Heat the cylinder head to 100 – 150°C (212 – 300° F) with a hot plate or oven.

NOTICE

Do not use a torch to heat the cylinder head; it may cause warping.

Support the cylinder head and drive out the valve guides from combustion chamber side of the cylinder head.

TOOL:

Valve guide remover 07942-MA60000

Drive in the guide to the specified depth from the top of the cylinder head.

SPECIFIED DEPTH:

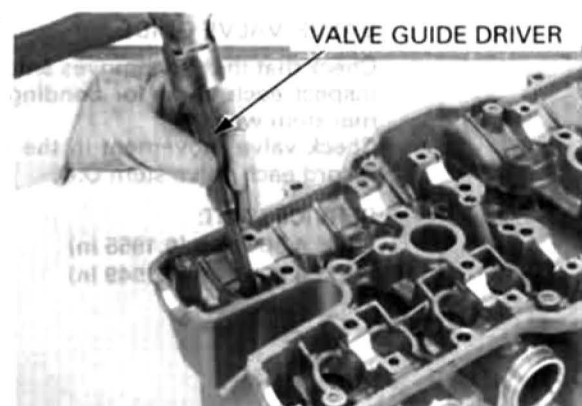
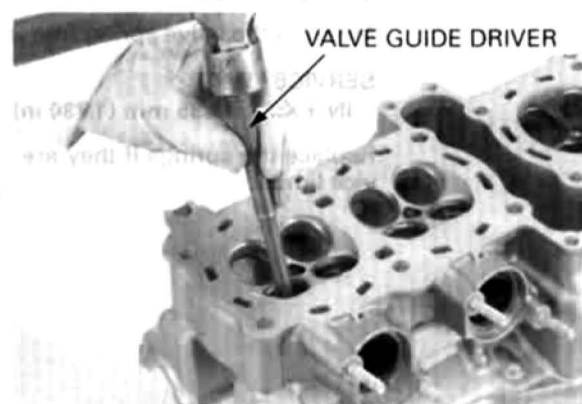
IN: 15.6 – 15.8 mm (0.61 – 0.62 in)

EX: 15.6 – 15.8 mm (0.61 – 0.62 in)

TOOL:

Valve guide driver 07743-0020000

Let the cylinder head cool to room temperature.



Use cutting oil on the reamer during this operation

Ream the new valve guide after installation. Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

TOOL:

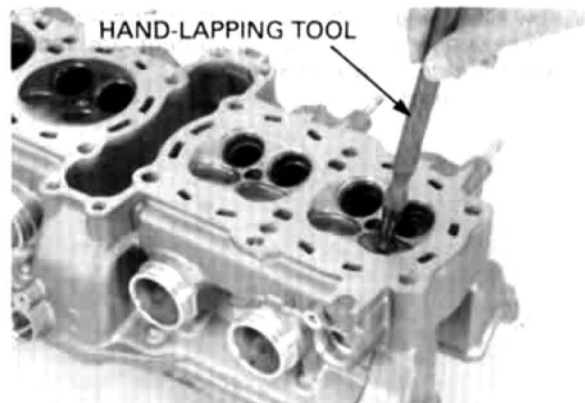
Valve guide reamer 07984-MA60001

Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seat (page 9-26).



VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats.
Tap the valves and seats using a rubber hose or other hand-lapping tool.

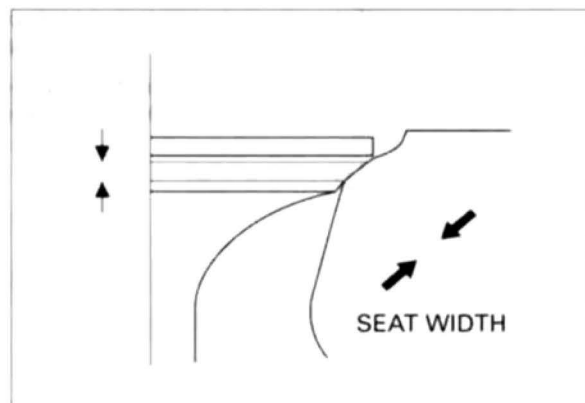


Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)

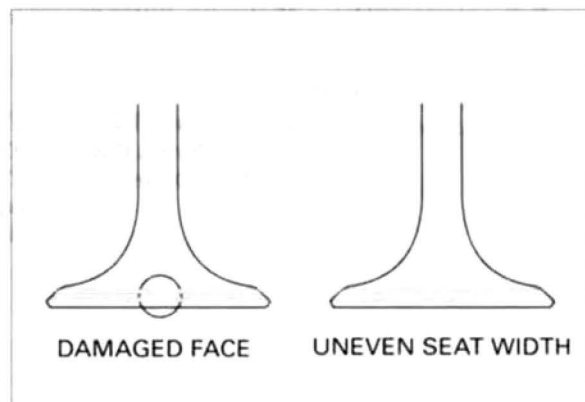
SERVICE LIMIT: 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat (page 9-26).



Inspect the valve seat face for:

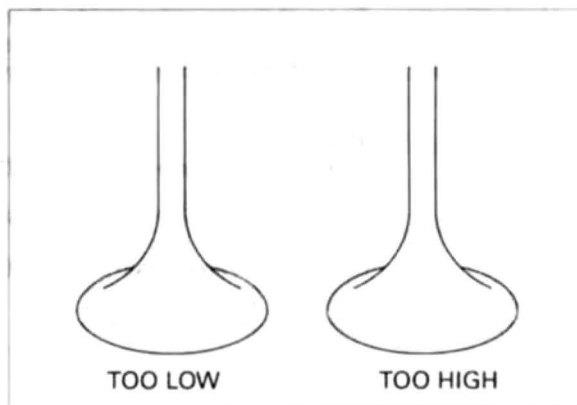
- Uneven seat width:
 - Replace the valve and reface the valve seat.
- Damaged face:
 - Replace the valve and reface the valve seat.



CYLINDER HEAD/CYLINDER/PISTON

The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

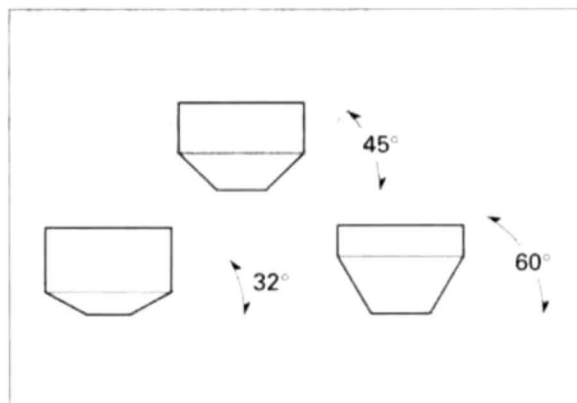
- Contact area (too high or too low)
 - Reface the valve seat.



VALVE SEAT REFACING

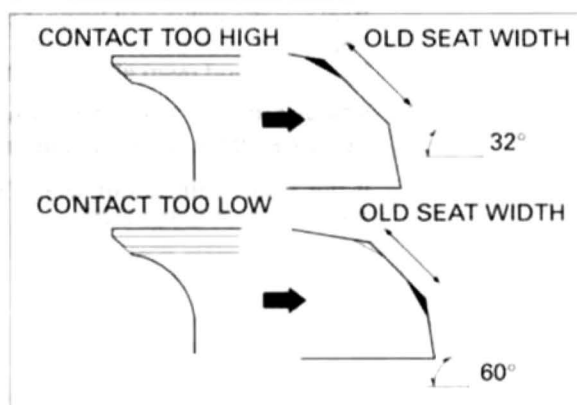
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



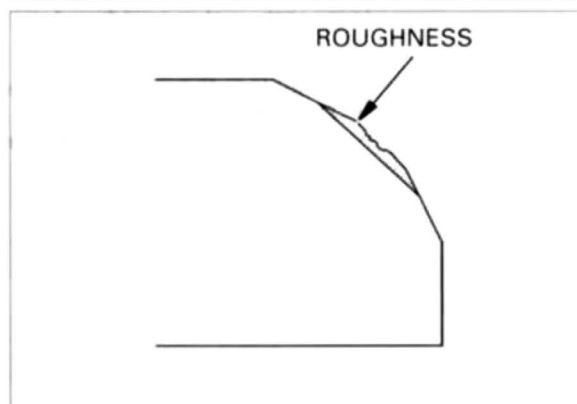
Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

Use a 45-degree cutter to remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 33 mm (IN)
Seat cutter, 27.5 mm (EX)
Cutter holder, 5.0 mm

07780-0010800
07780-0010200
07781-0010400 or
equivalent commercially available



Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 33 mm (IN)

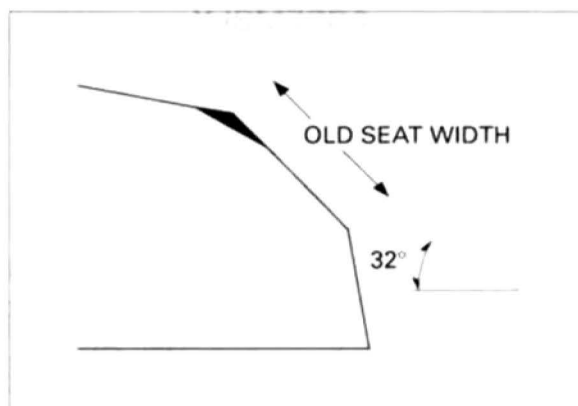
Flat cutter, 28 mm (EX)

Cutter holder, 5.0 mm

07780-0012900

07780-0012100

07781-0010400 or
equivalent commercially available



Use a 60-degree cutter to remove the bottom 1/4 of the old seat.

TOOLS:

Interior cutter, 30 mm (IN)

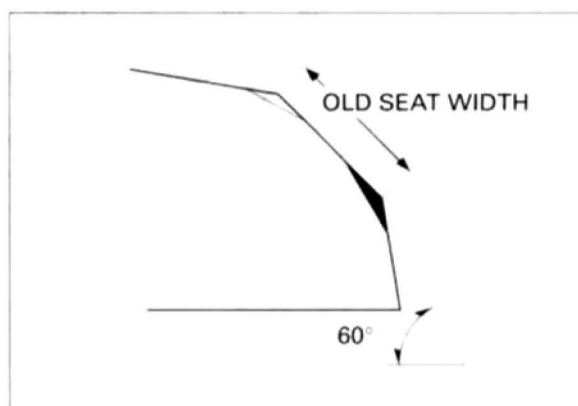
Interior cutter, 26 mm (EX)

Cutter holder, 5.0 mm

07780-0014000

07780-0014500

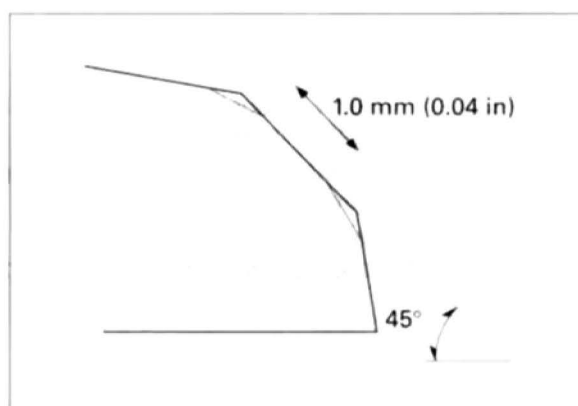
07781-0010400 or
equivalent commercially available



Using a 45° seat cutter, cut the seat to the proper width.

Make sure that all pitting and irregularities are removed.

Refinish if necessary.



After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

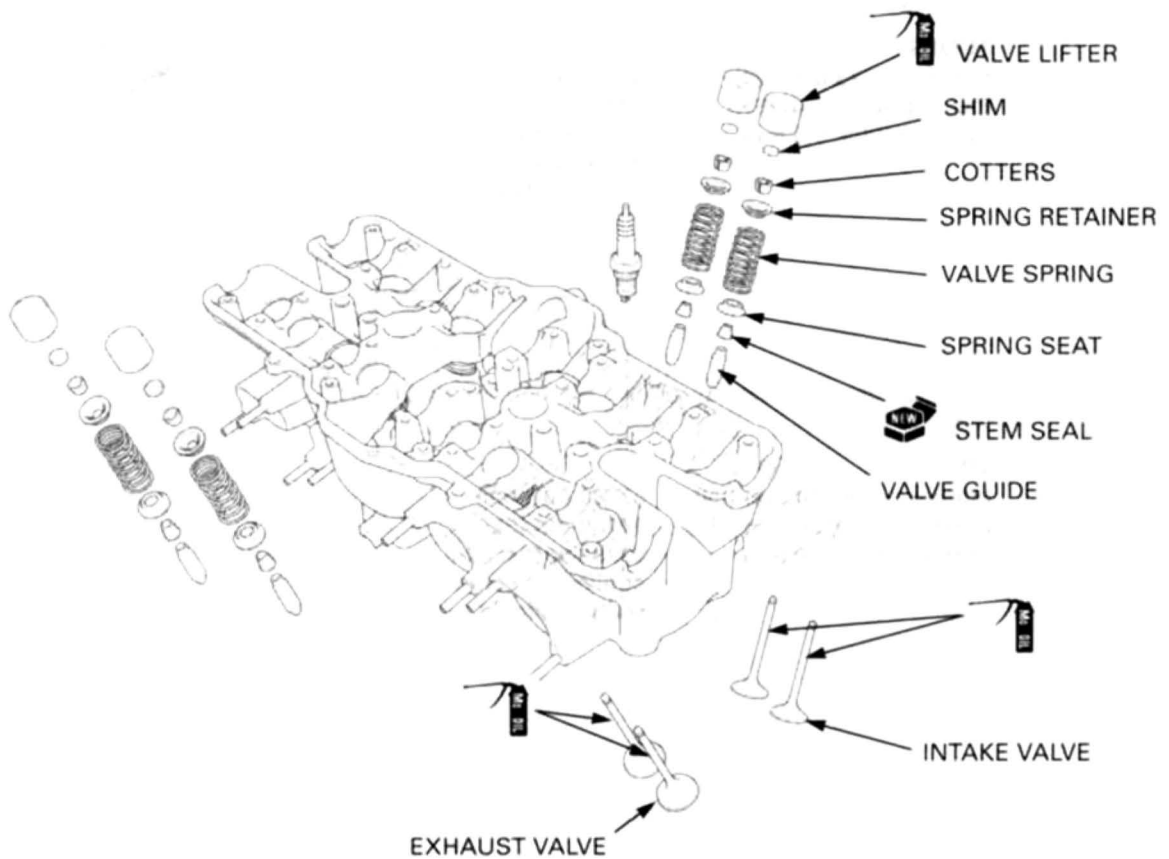
NOTICE

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

After lapping, wash all residual compound off the cylinder head and valve.



ASSEMBLY



Blow through all oil passages in the cylinder head with compressed air.

Install the tappet hole protector into the valve lifter bore.

TOOL:

Tappet hole protector

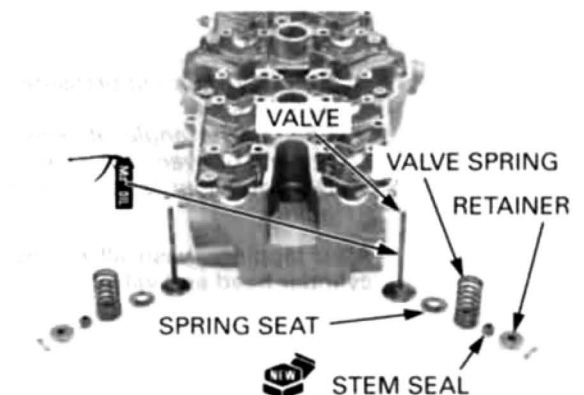
07HMG-MR70002



Install the valve spring seats.
Install the new stem seals.

Lubricate the valve stems with molybdenum oil solution.

Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.



Install the valve spring with the tightly wound coils facing the combustion chamber.
Install the valve spring retainer.

Grease the cotters to ease installation.

Install the valve cotters using the special tool as shown.

NOTICE

To prevent loss of tension, do not compress the valve spring more than necessary.

TOOLS:

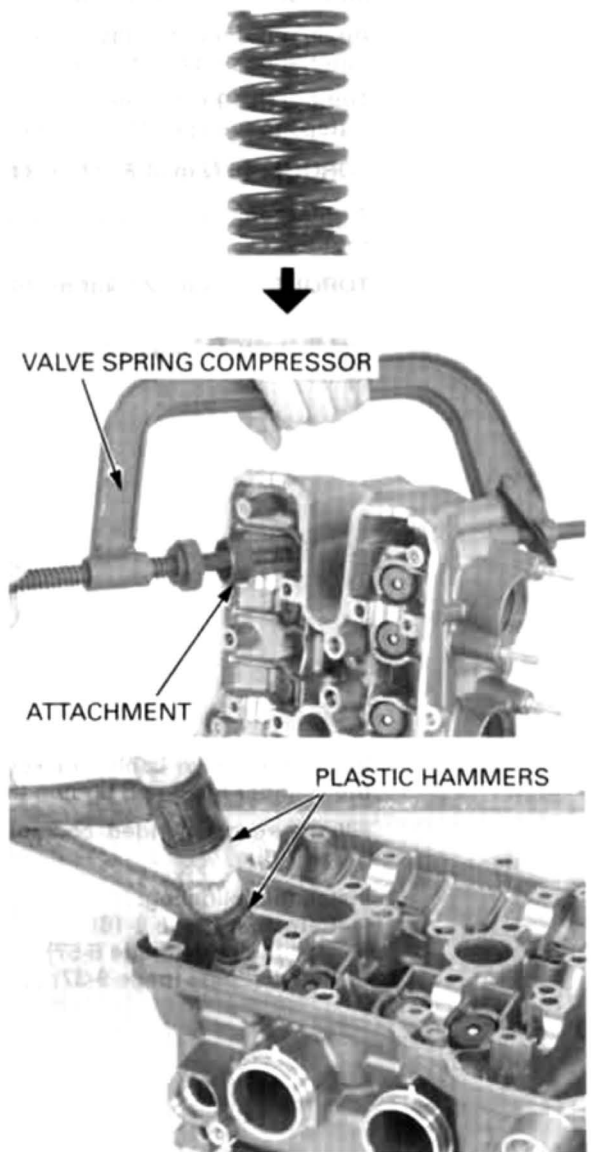
Valve spring compressor 07757-0010000
Valve spring compressor attachment 07959-KM30101

Support the cylinder head above the work bench surface to prevent possible valve damage.

Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

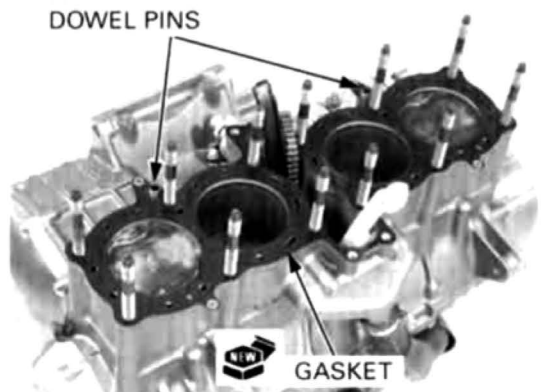
Install and tighten the spark plugs.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



INSTALLATION

Install the dowel pins and a new cylinder head gasket as shown.



CYLINDER HEAD/CYLINDER/PISTON

Install the cylinder head onto the cylinder block.

Apply oil to the threads and seating surface of the 9 mm nuts and install the washers and nuts.

Apply oil to the threads and seating surface of the 8 mm flange bolts and install them.

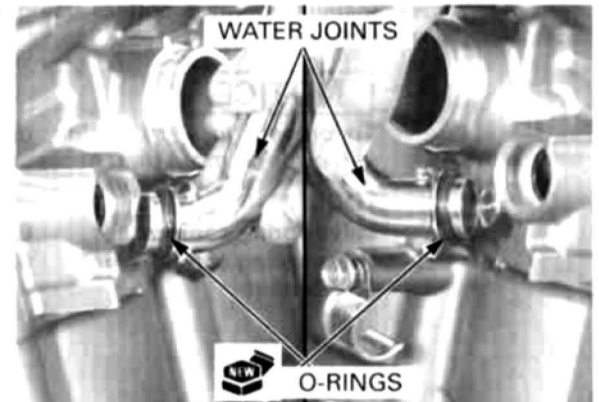
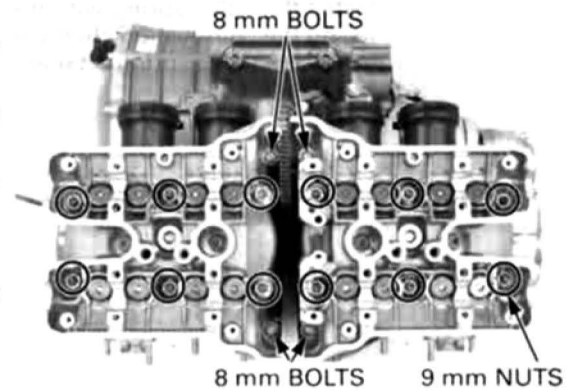
Tighten the 9 mm nuts in a crisscross pattern in 2 – 3 steps to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Tighten the 8 mm flange bolts to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Install new O-rings onto the flange of the water joints.

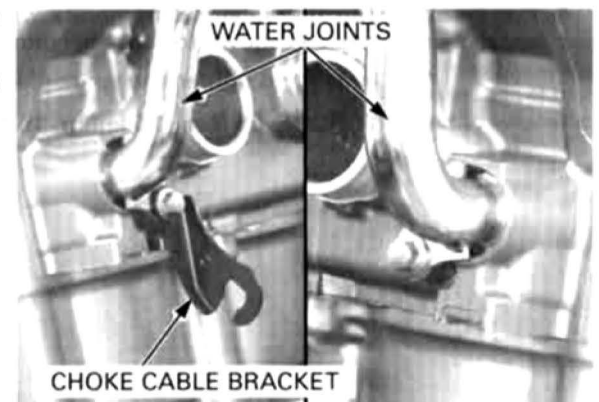


Install the choke cable bracket and water joints to the cylinder head and tighten the bolts.

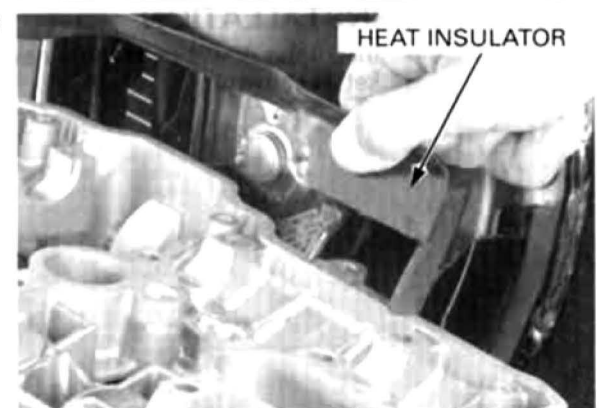
Fill the recommended coolant up to proper level (page 7-6).

Install the following:

- Camshaft (page 9-16)
- Throttle body (page 6-57)
- Exhaust pipe (page 9-37)



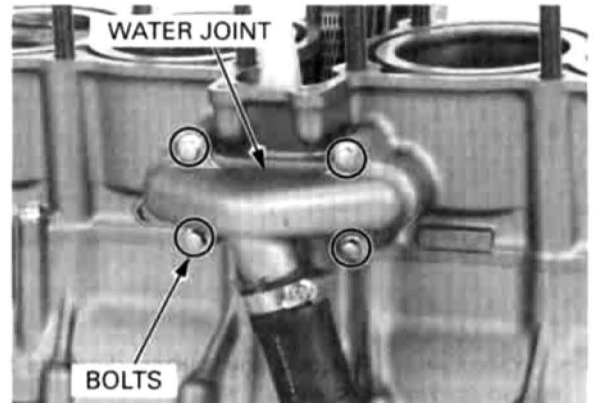
Install the radiator heat insulator while aligning its bosses with the cylinder head holes.



CYLINDER/PISTON

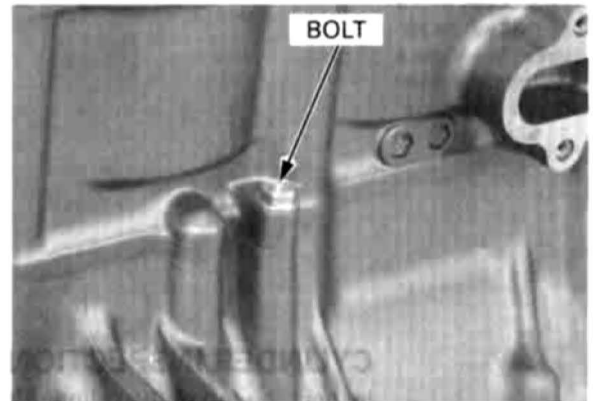
REMOVAL

Remove the bolts and water joint.

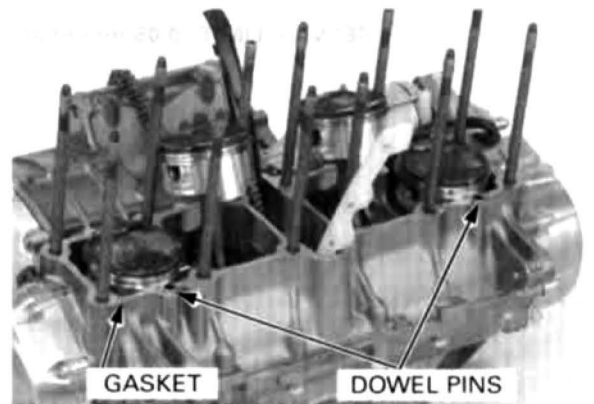


Remove the cylinder mounting bolt.

Remove the cylinder.



Remove the gasket and dowel pins.

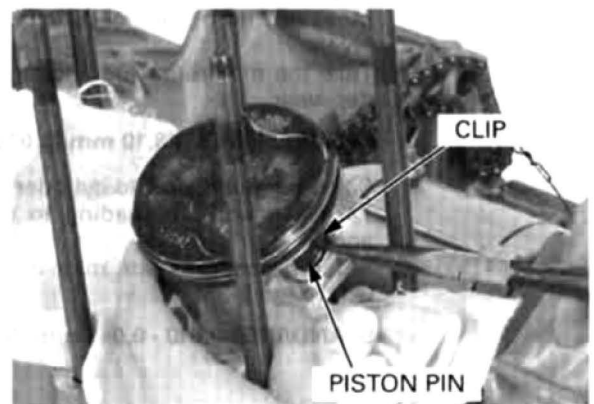


Mark the all the parts as you remove them to indicate the correct cylinder for reassembly.

Avoid falling the piston pin clips, cover the crankcase opening with a shop towel or equivalent.

Remove the piston pin clip with pliers.

Push the piston pin out of the piston and connecting rod, and remove the piston.



CYLINDER HEAD/CYLINDER/PISTON

DISASSEMBLY

Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up at a point opposite the gap.



Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.

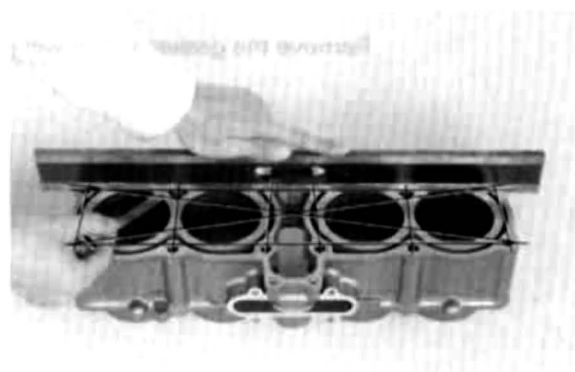
Remove any carbon deposits from the piston ring grooves.



CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.05 mm (0.002 in)



Inspect the cylinder bore for wear or damage. Measure the cylinder I.D. in X and Y axis at three levels. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 78.10 mm (3.075 in)

Calculate the piston-to-cylinder clearance. Take a maximum reading to determine the clearance. Refer procedures for measurement of the piston O.D (page 9-33).

STANDARD: 0.010 - 0.045 mm (0.0004 - 0.0018 in)



Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMITS:

Taper: 0.05 mm (0.002 in)

Out of round: 0.05 mm (0.002 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:

0.25 mm (0.010 in)

0.50 mm (0.020 in)

The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).

PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:

Top: 0.09 mm (0.004 in)

Second: 0.09 mm (0.004 in)

Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

SERVICE LIMITS:

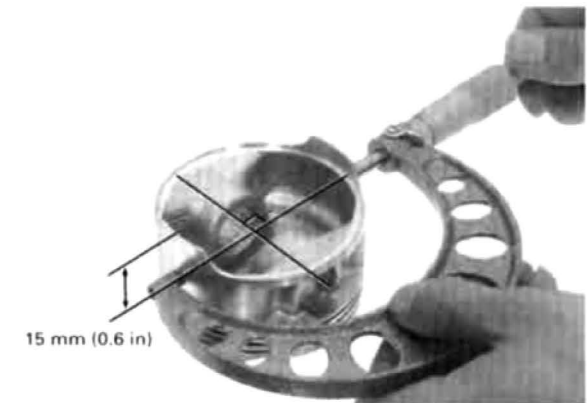
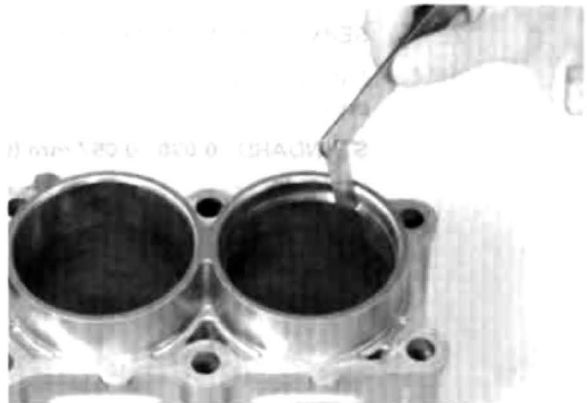
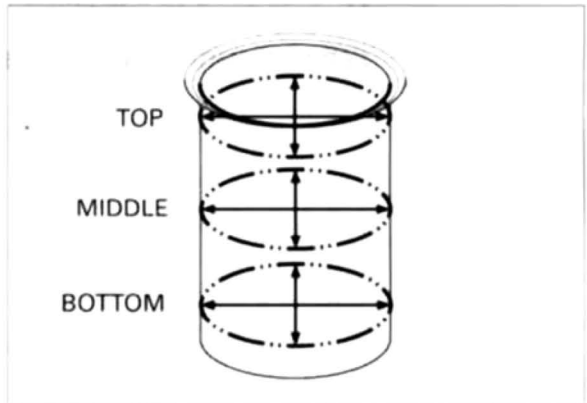
Top: 0.58 mm (0.023 in)

Second: 0.65 mm (0.026 in)

Oil (side rail): 0.85 mm (0.033 in)

Measure the diameter of the piston at 15 mm (0.6 in) from the bottom and 90 degrees to the piston pin hole.

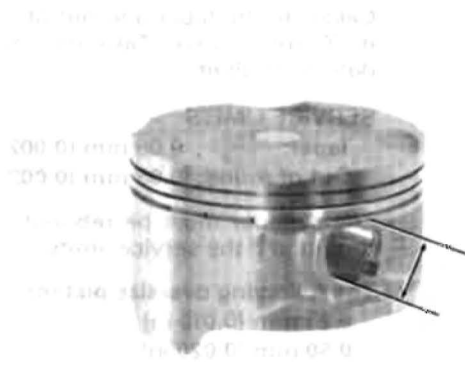
SERVICE LIMIT: 77.87 mm (3.066 in)



CYLINDER HEAD/CYLINDER/PISTON

Measure the piston pin bore.

SERVICE LIMIT: 19.06 mm (0.750 in)

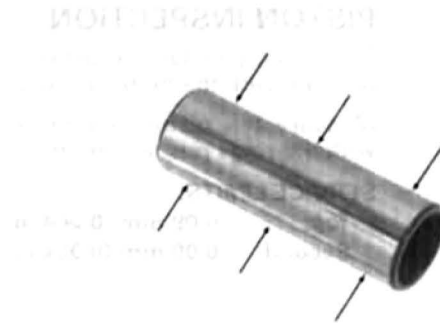


Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.98 mm (0.747 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



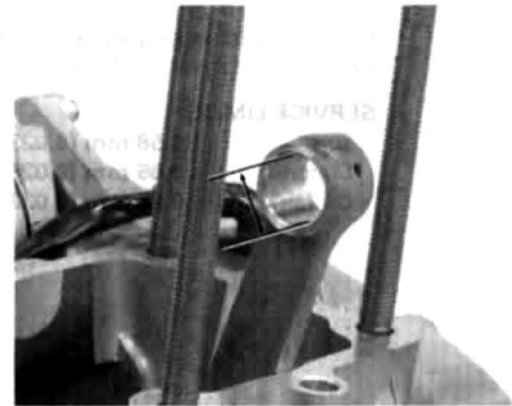
CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

SERVICE LIMIT: 19.061 mm (0.7504 in)

Calculate the connecting rod-to-piston pin clearance.

STANDARD: 0.030 - 0.057 mm (0.0012 - 0.0022 in)



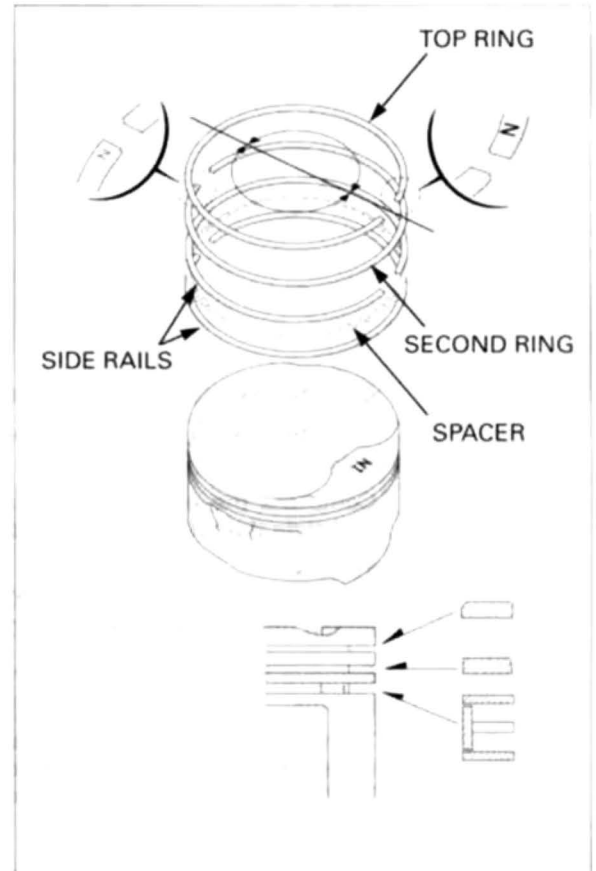
PISTON ASSEMBLY

Carefully install the piston rings into the piston ring grooves with their marking facing up.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (N) facing up.
- Do not mix the top and second rings; top ring is narrower than the second ring in width.

Stagger the piston ring end gaps 180° apart from each other.

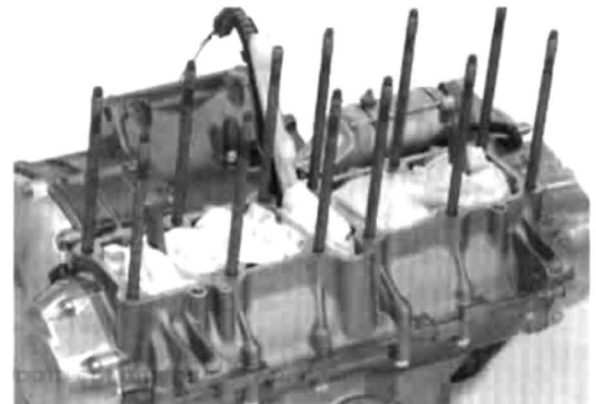
Stagger the side rail end gaps as shown.



INSTALLATION

Be careful not to damage the gasket mating surface.

Clean any gasket material from the cylinder base and crankcase upper surface.



Apply molybdenum disulfide oil to the piston pin outer surface.

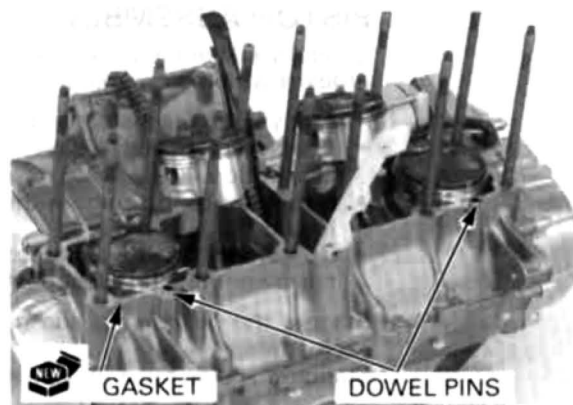
Install the piston pin, and secure it using a new piston pin clips.

- Make sure that the piston pin clips seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.



CYLINDER HEAD/CYLINDER/PISTON

Install a dowel pins and new gasket.



Coat the cylinder bores and pistons with engine oil.
Place the piston bases under the No.2 and No.3 pistons.

Compress the piston rings using the special tools and slide the cylinder over the pistons.

TOOLS:

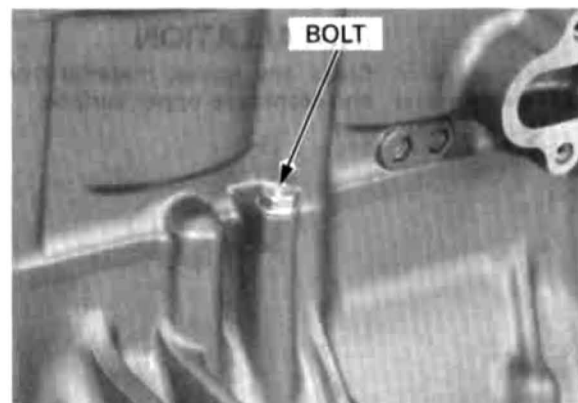
Piston base	07958-2500001
Piston ring compressor	07PME-MZ20100

Remove the piston bases from the No.2 and No.3 pistons.

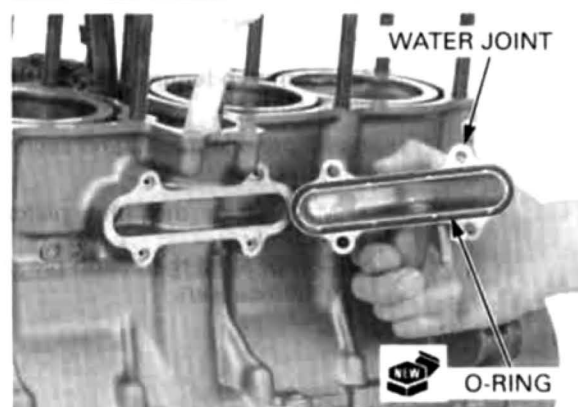
Turn the crankshaft and install the piston bases under the No.1 and No.4 pistons, then install the No.1 and No.4 pistons into the cylinder.

Remove the piston bases.

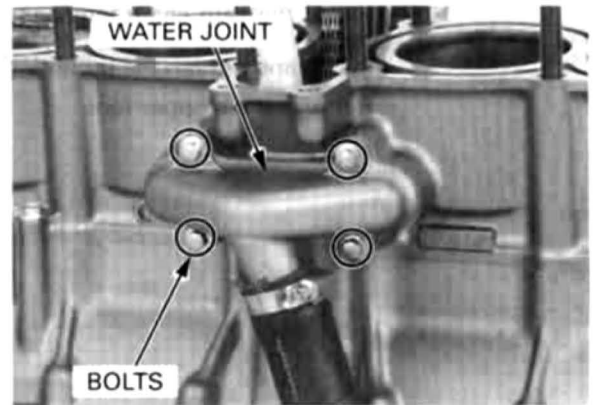
Install and tighten the cylinder mounting bolt.



Install new O-ring into the groove of the water joint.



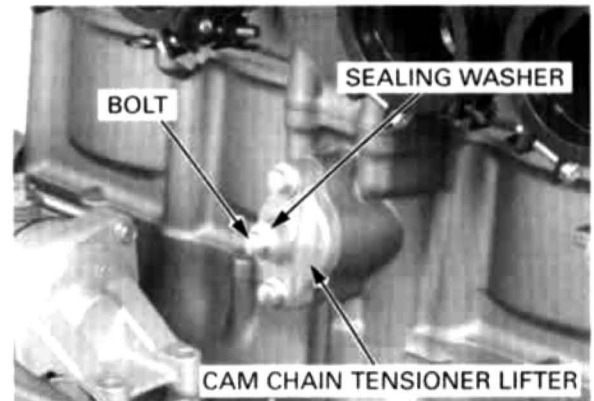
Install the water joint onto the cylinder and tighten the bolts securely.



CAM CHAIN TENSIONER LIFTER

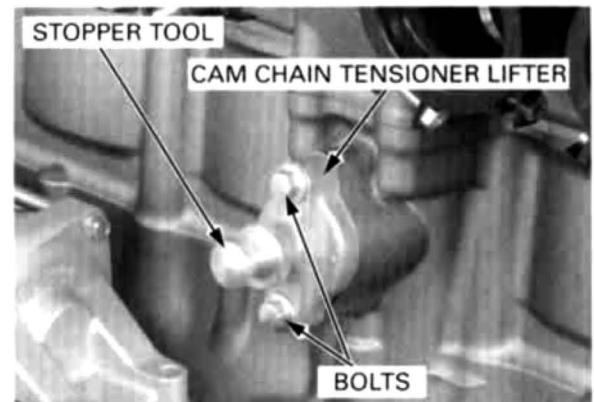
REMOVAL

Remove the cam chain tensioner sealing bolt and sealing washer.



Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool (page 9-13) to prevent damaging the cam chain.

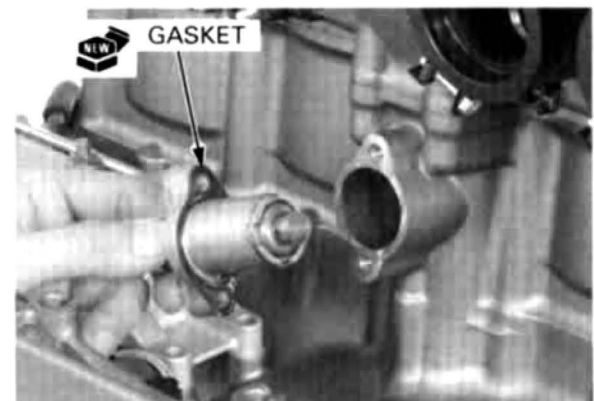
Remove the bolts and cam chain tensioner lifter. Remove the gasket.



INSTALLATION

Note the installation direction of the gasket.

Install the new gasket onto the cam chain tensioner lifter.

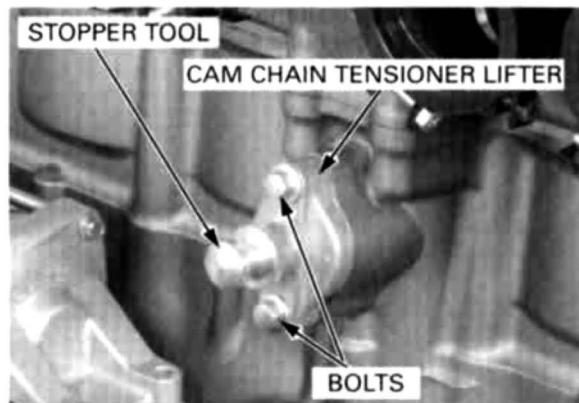


CYLINDER HEAD/CYLINDER/PISTON

Install the cam chain tensioner lifter into the cylinder.

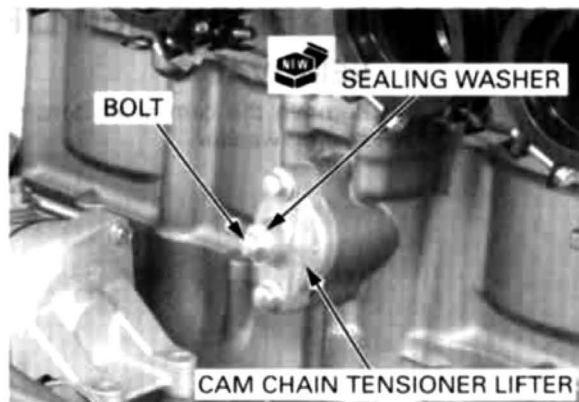
Install and tighten the mounting bolts.

Remove the stopper tool.



Install a new sealing washer and tighten the sealing bolt securely.

Install the removed parts in the reverse order of removal.

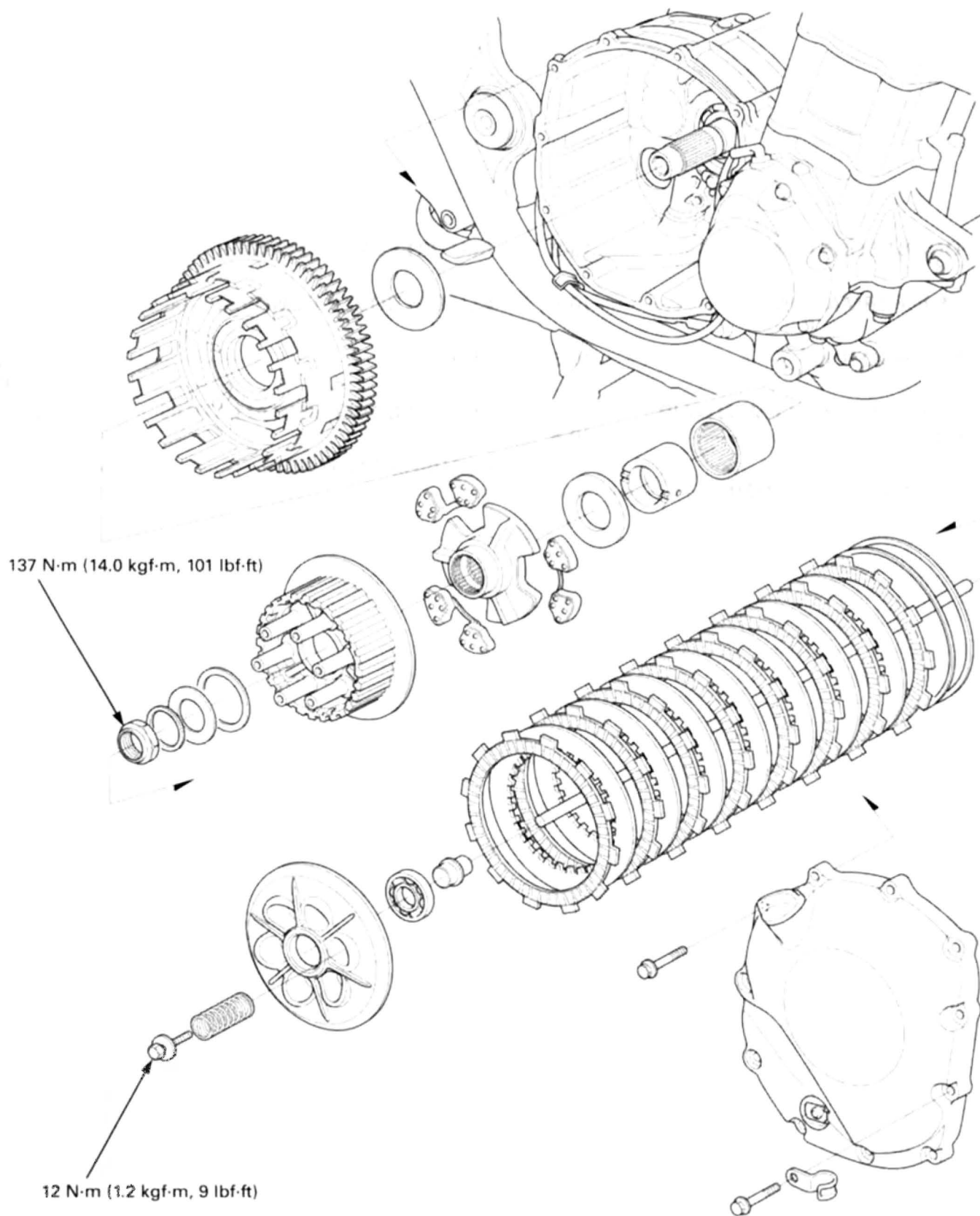


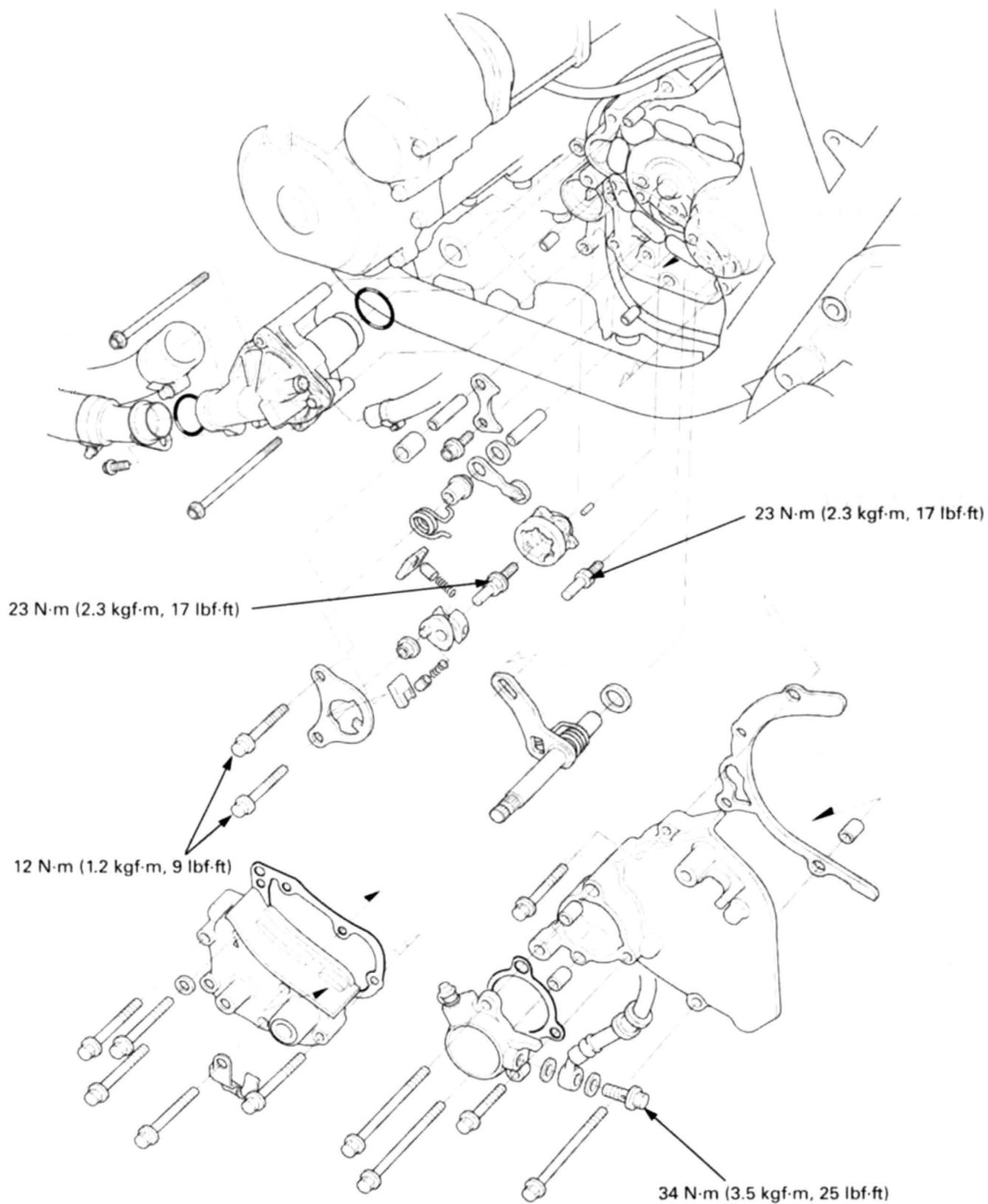
10. CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION	10-2	CLUTCH SLAVE CYLINDER	10-13
SERVICE INFORMATION	10-4	CLUTCH COVER REMOVAL	10-14
TROUBLESHOOTING	10-5	CLUTCH	10-16
CLUTCH FLUID REPLACEMENT/AIR BLEEDING	10-6	CLUTCH COVER INSTALLATION	10-24
CLUTCH MASTER CYLINDER	10-8	GEARSHIFT LINKAGE	10-25

CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION





SERVICE INFORMATION

GENERAL

NOTICE

Spilled fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

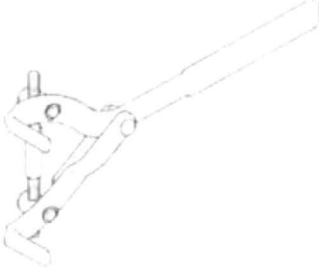
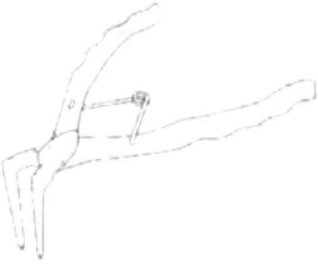
SPECIFICATIONS

ITEM		STANDARD	Unit: mm (in)
Recommended clutch fluid		Honda DOT 4 brake fluid	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	12.7 (0.50)	—
Clutch	Spring free length	61.53 (2.422)	60.3 (2.37)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	—	0.30 (0.012)
Clutch outer guide	I.D.	27.995 – 28.012 (1.1022 – 1.1028)	28.08 (1.106)
	O.D.	39.992 – 40.008 (1.5745 – 1.5751)	39.93 (1.572)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.10 (1.067)

TORQUE VALUES

Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch master cylinder reservoir cover screw	2 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Clutch switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Clutch master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch cover rubber plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	137 N·m (14.0 kgf·m, 101 lbf·ft)	Apply a locking agent to the threads Apply oil to the thread Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch slave cylinder bleeder screw	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Left crankcase side cover mounting special bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Shift fork shaft stopper plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Shift drum center bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Gearshift pedal link pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOL

Clutch center holder 07724-0050002 	Snap ring pliers 07914-SA50001 
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TROUBLESHOOTING

Clutch lever soft or spongy

- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever too hard to pull in

- Sticking master cylinder piston
- Sticking slave cylinder
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating

- Hydraulic system sticking
- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking or clogged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

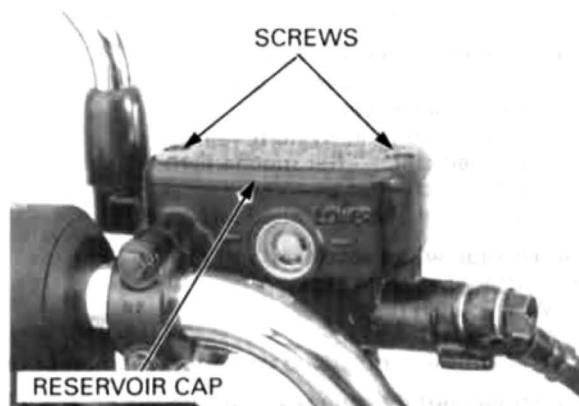
CLUTCH FLUID REPLACEMENT/AIR BLEEDING

CLUTCH FLUID DRAINING

Remove the left crankcase side cover (page 8-4).

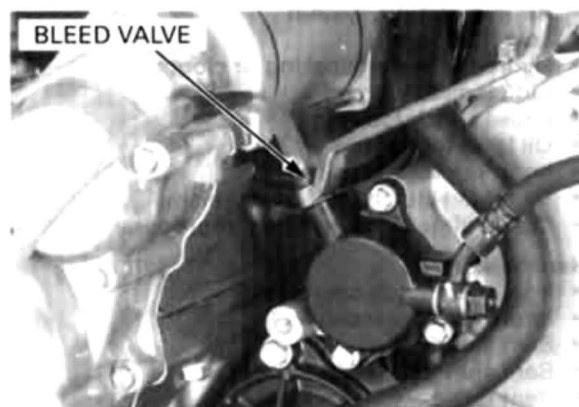
Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the bleed valve of the clutch slave cylinder.

Loosen the bleed valve and pump the clutch lever until fluid stops flowing out of the bleed valve.



CLUTCH FLUID FILLING/AIR BLEEDING

Use only DOT 4 brake fluid from a sealed container

Fill the reservoir with DOT 4 Brake fluid from a sealed container.

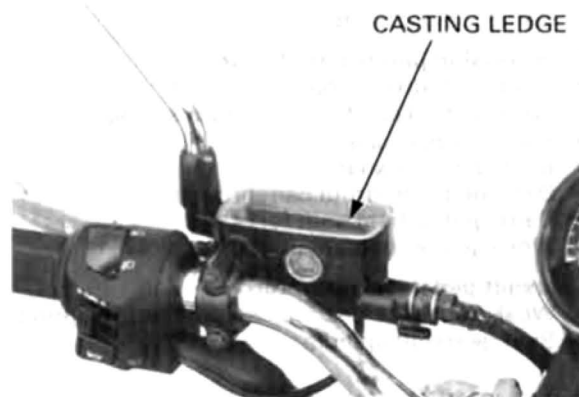
Connect a commercially available brake bleeder to the bleed valve.

Do not mix different types of fluid. They are not compatible

Pump the brake bleeder and loosen the bleed valve.

Add brake fluid when the fluid level in the reservoir is low.

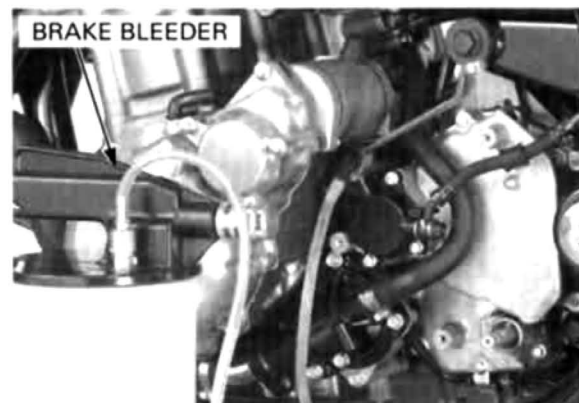
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instruction.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape

Repeat the above procedures until new fluid flows out of the bleed valve and air bubbles do not appear in the plastic hose.

Close the bleed valve and operate the clutch lever. If it is still spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure.

Pump the clutch lever until lever resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

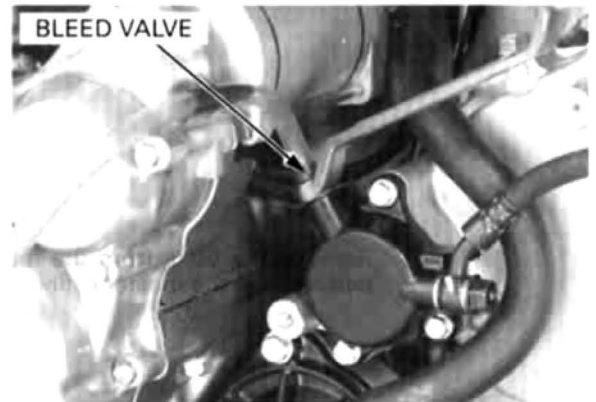
1. Squeeze the clutch lever, open the bleed valve 1/4 of a turn and then close it. Do not release the clutch lever until the bleed valve has been closed.
2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.



Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

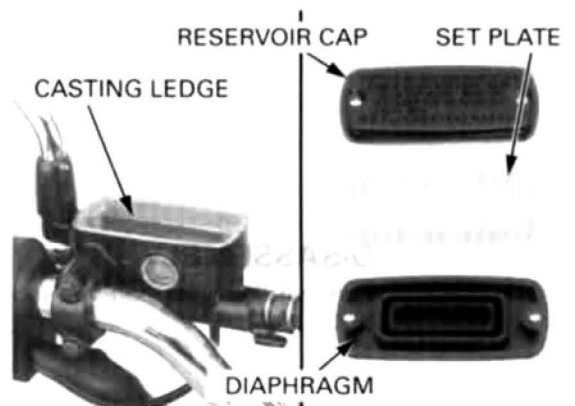
Tighten the bleed valve to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

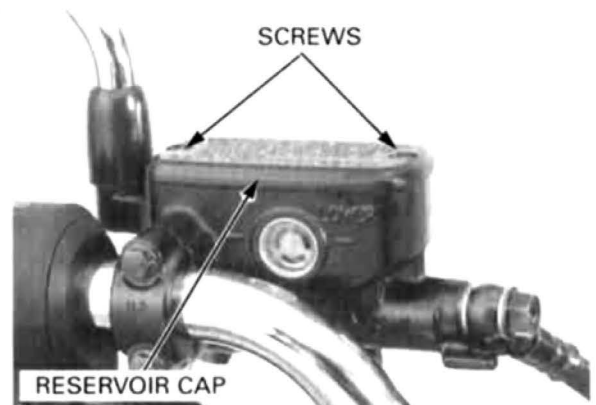
Install the diaphragm, set plate and reservoir cap.



Install and tighten the cap screws to the specified torque.

TORQUE: 2 N·m (0.15 kgf·m, 1.1 lbf·ft)

Check the clutch operation (page 4-28).



CLUTCH MASTER CYLINDER

REMOVAL

NOTICE

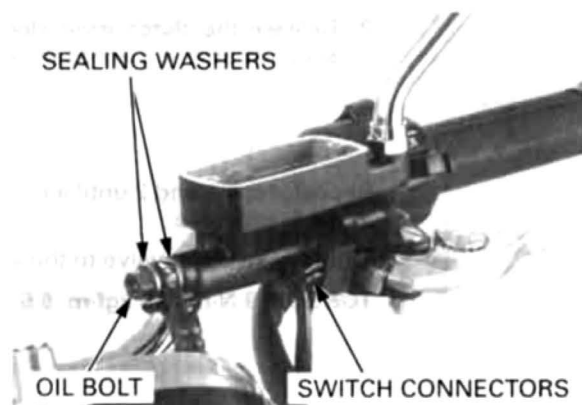
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Drain the clutch hydraulic system (page 10-6).

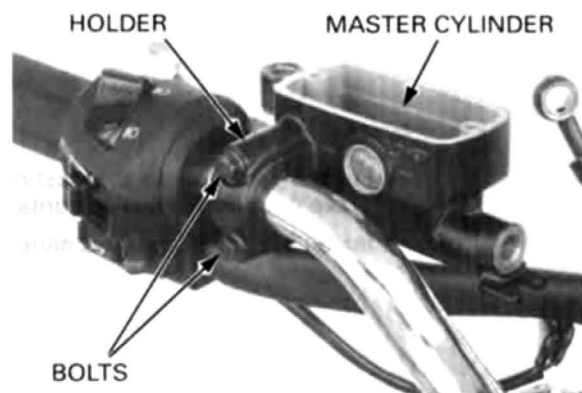
Remove the left rearview mirror.

Disconnect the clutch switch wire connectors.

Remove the clutch hose oil bolt, sealing washers and clutch hose eyelet.

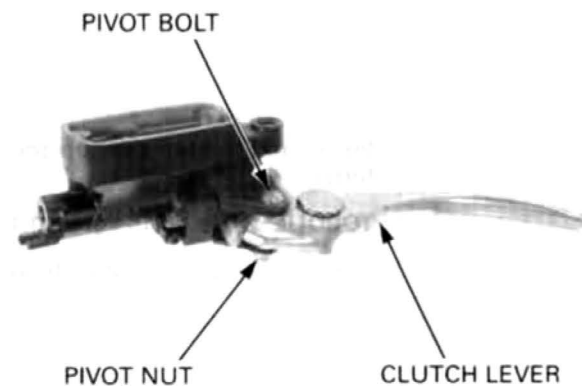


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

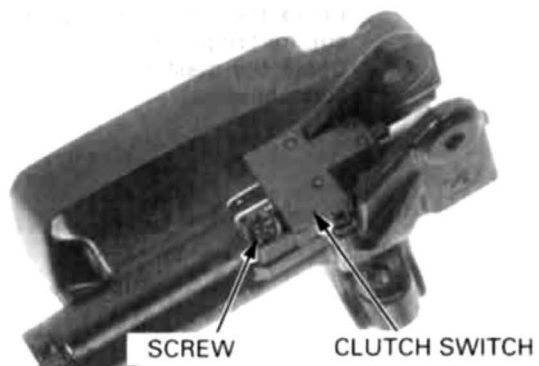


DISASSEMBLY

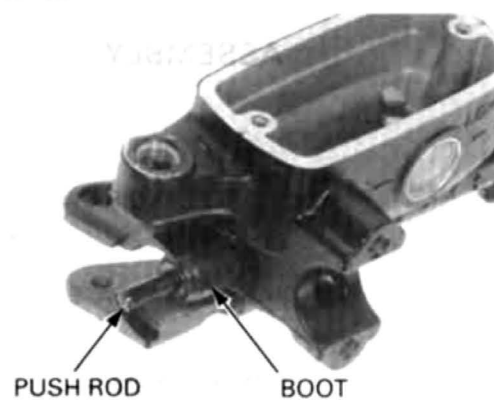
Remove the pivot bolt/nut and clutch lever assembly.



Remove the screw and clutch switch.



Remove the boot and push rod.

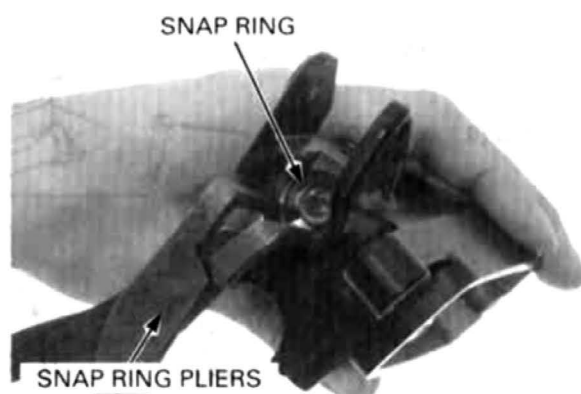


Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

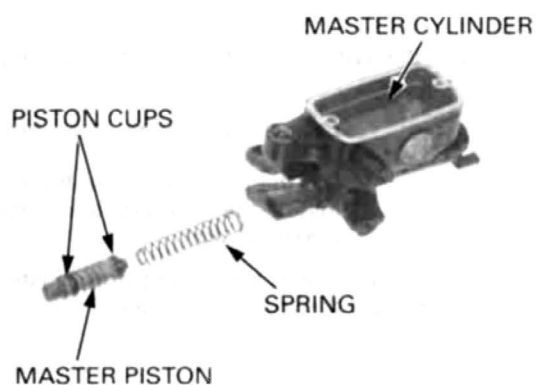
Snap ring pliers

07914-SA50001



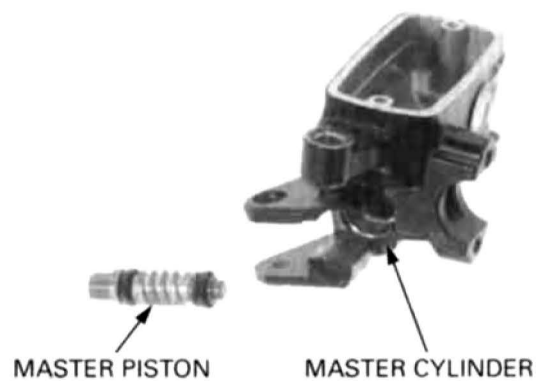
Remove the master piston assembly and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

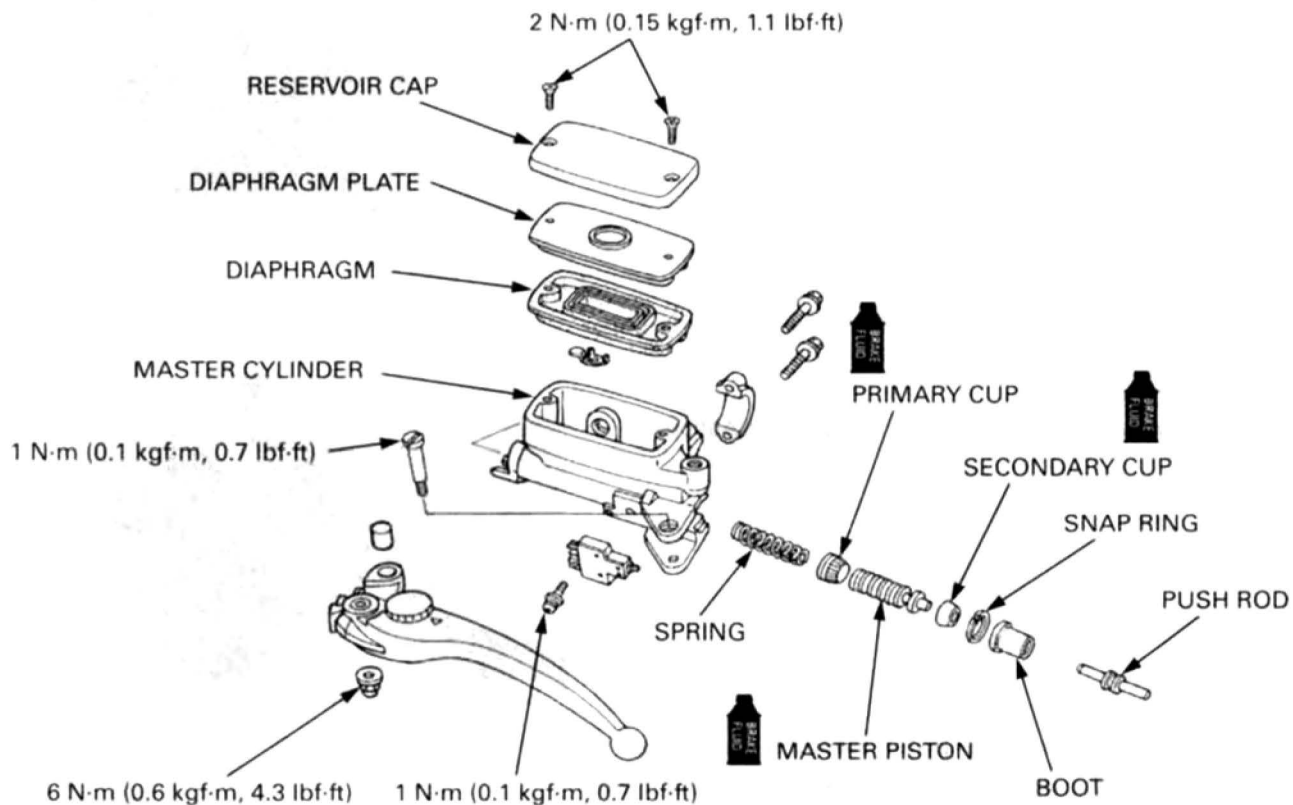


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.



ASSEMBLY



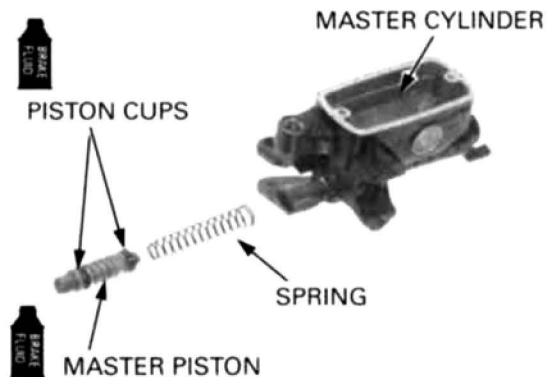
Coat all parts with clean brake fluid before assembly.

Dip the piston in brake fluid.

Install the primary and secondary cups onto the master piston.

When installing the cups, do not allow the lips to turn inside out.

Install the spring and master piston assembly into the master cylinder.



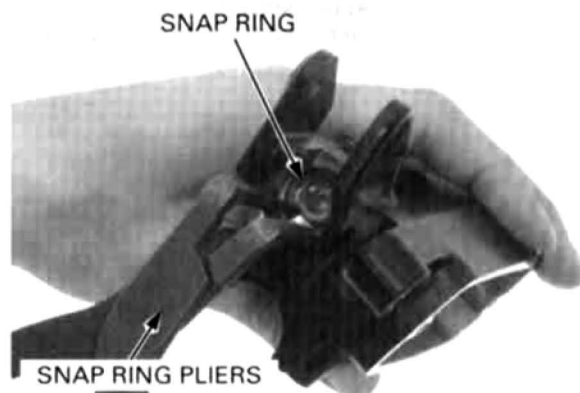
Be certain the snap ring is firmly seated in the groove.

Install the snap ring using the special tool.

TOOL:

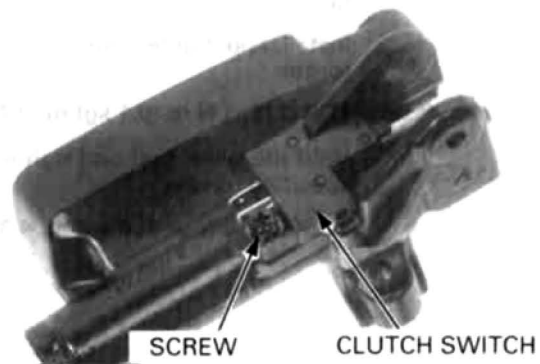
Snap ring pliers

07914-SA50001

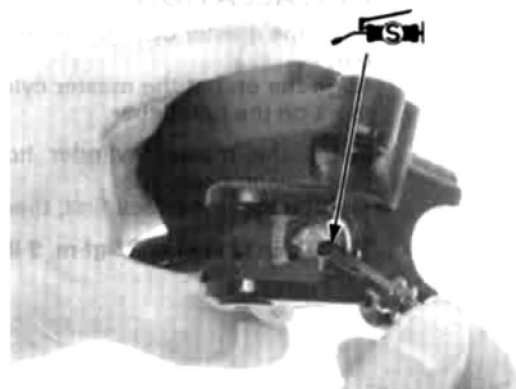


Install the clutch switch and tighten the screw to the specified torque.

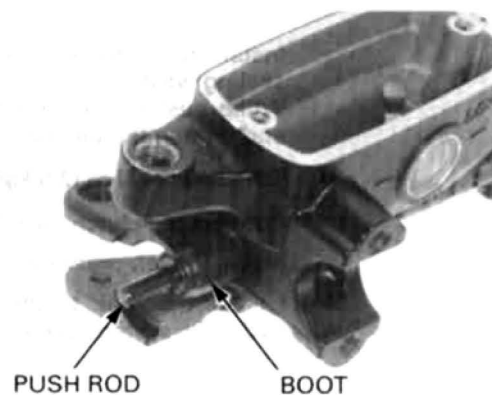
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Apply silicone grease to the boot inside and tip of the push rod.

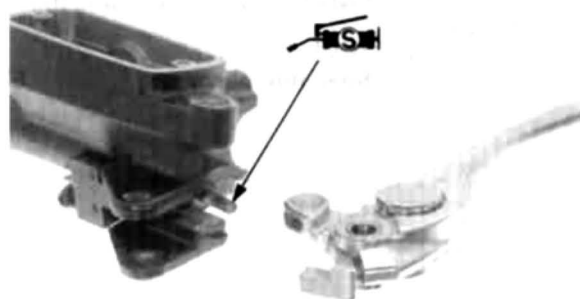


Install the push rod and boot.



CLUTCH/GEARSHIFT LINKAGE

Apply silicone grease to the top of the push rod, then install the clutch lever assembly.



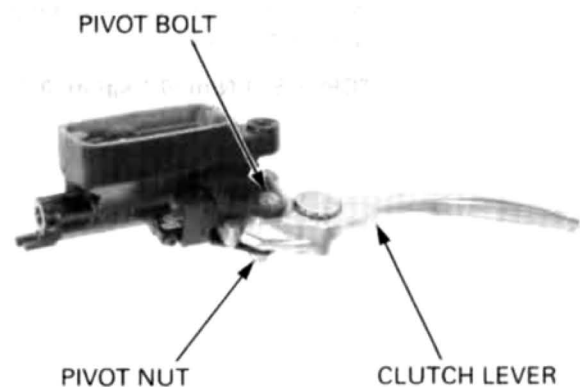
Apply grease to the clutch lever pivot sliding surface.

Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



INSTALLATION

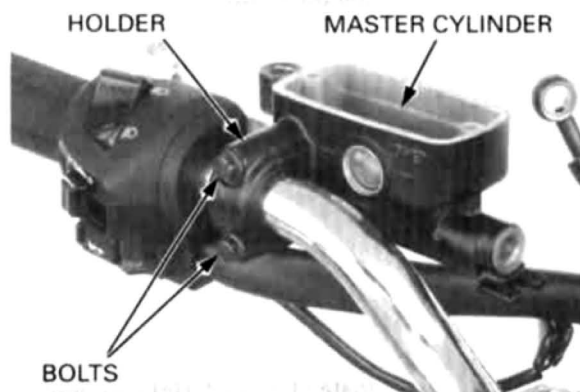
Place the master cylinder assembly onto the handlebar.

Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the clutch hose eyelet, the oil bolt, and new sealing washers.

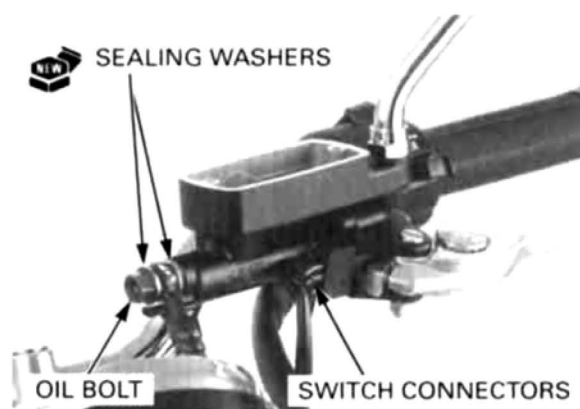
While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the clutch switch connectors.

Install the left rearview mirror.

Fill the reservoir to the upper level and bleed the hydraulic system (page 10-6).



CLUTCH SLAVE CYLINDER

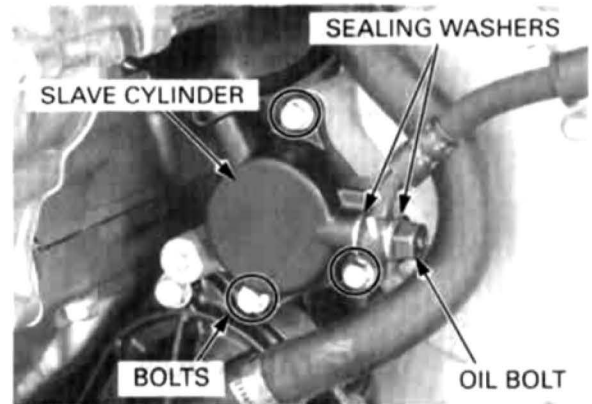
REMOVAL

Drain the clutch hydraulic system (page 10-6).

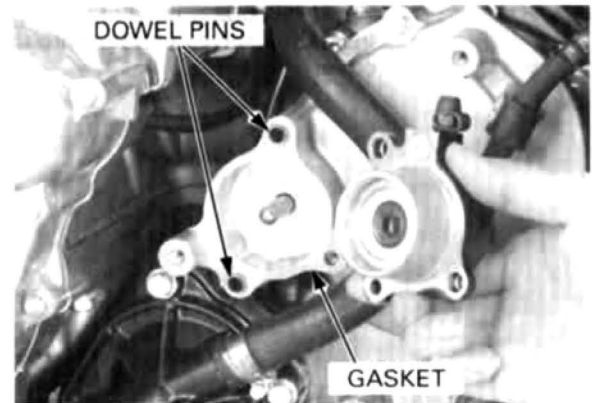
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the clutch hose oil bolt, sealing washers and brake hose eyelet.

Remove the bolts and clutch slave cylinder assembly.



Remove the gasket and dowel pins.



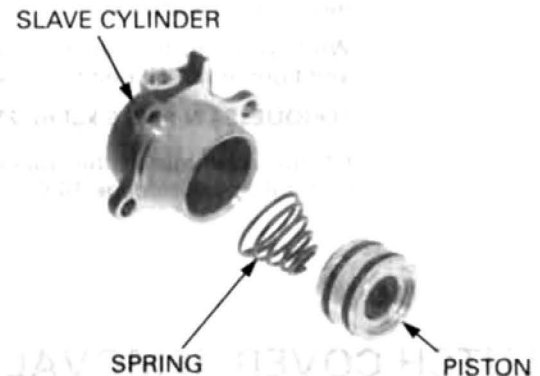
DISASSEMBLY

Remove the slave cylinder piston and spring. If the piston is hard to remove, remove the following:

Place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Do not use high pressure air or bring the nozzle to close to the inlet.

Apply small squirts of air pressure to the fluid inlet to remove the pistons.

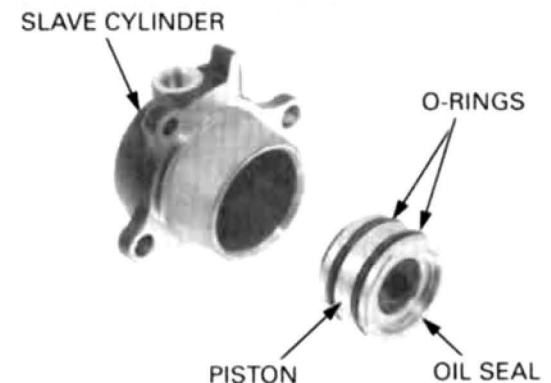


INSPECTION

Check the piston spring for weakness or damage. Inspect the oil seal and O-rings for damage or deterioration, replace if necessary. Clean the O-ring grooves with clean brake fluid.

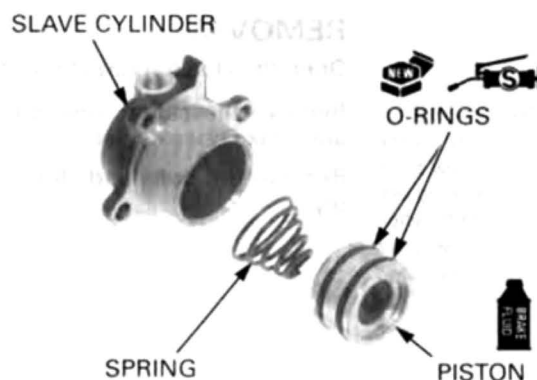
Check the slave cylinder for scoring or other damage.

Check the slave cylinder piston for scratches, scoring or other damage.



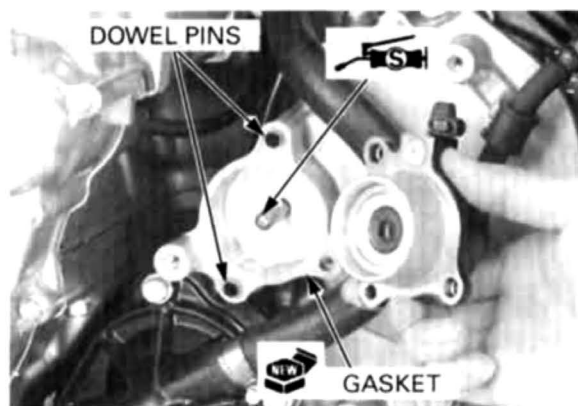
ASSEMBLY

Lubricate the piston with brake fluid.
Apply silicone grease to the new O-rings and install them to the slave cylinder piston grooves.
Install the spring into the boss of the piston.
Install the spring and piston into the slave cylinder



INSTALLATION

Install the dowel pins and new gasket.
Apply silicone grease to the top of the push rod.
Install the slave cylinder onto the left crankcase rear cover.



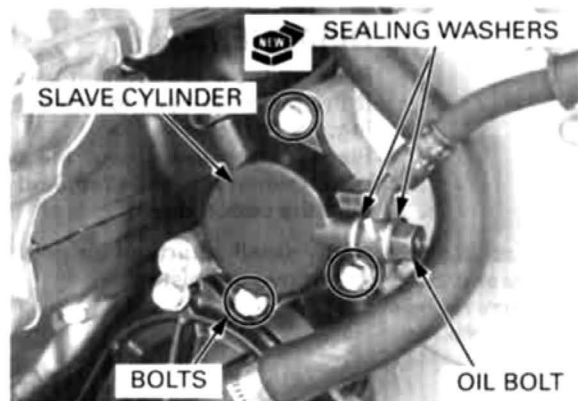
Install and tighten the SH bolts.

Install the clutch hose eyelet with the oil bolt and new sealing washers.

While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

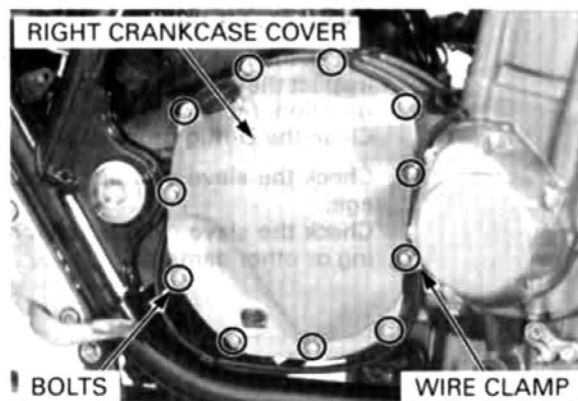
Fill the reservoir to the upper level and bleed the hydraulic system page 10-6.



CLUTCH COVER REMOVAL

Drain the engine oil (page 4-15).

Remove the SH bolts, wire clamp and clutch cover.



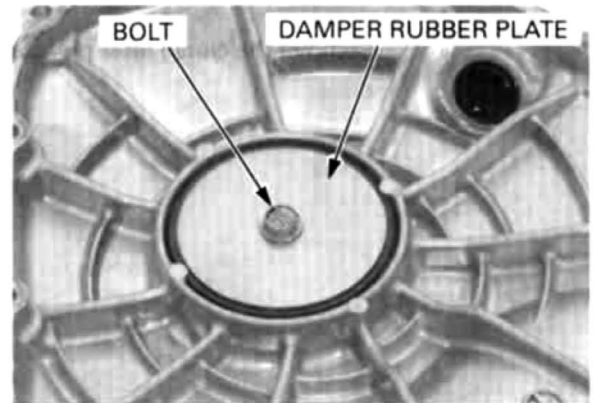
Be careful not to
damage the mating
surface

Clean any sealant off from the clutch cover mating
surfaces.



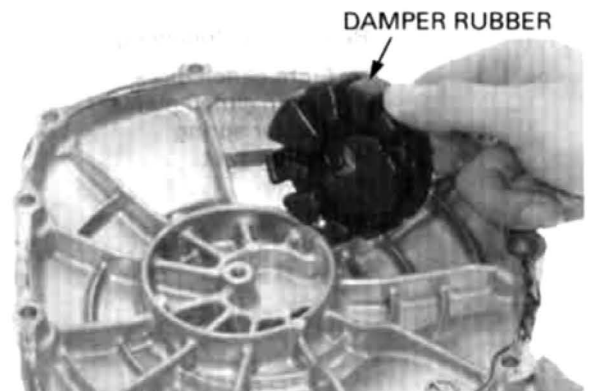
CLUTCH DAMPER RUBBER REPLACEMENT

Remove the bolt and clutch damper rubber plate.



Remove the damper rubber from the clutch cover.

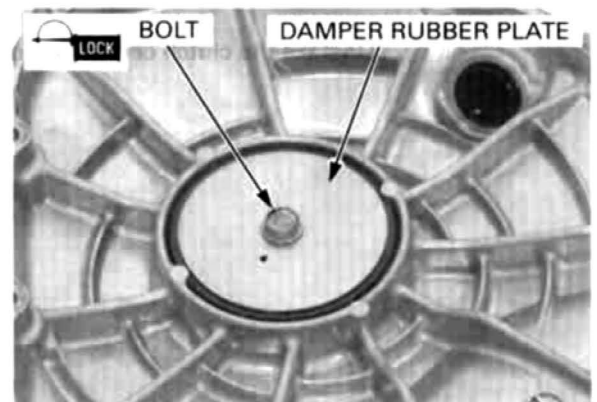
Install the damper rubber into the clutch cover while
aligning the rubber with the groove on the clutch
cover.



Install the damper rubber plate.

Apply a locking agent to the plate bolt threads.
Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

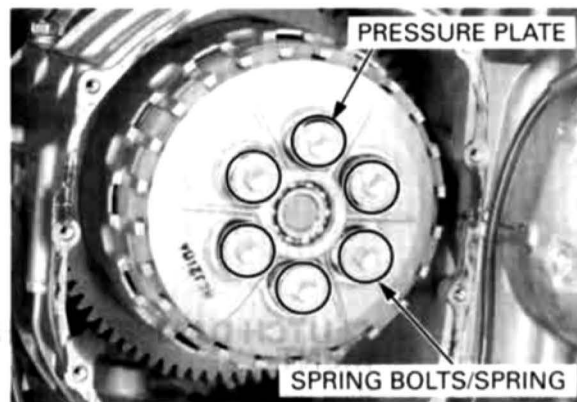


CLUTCH

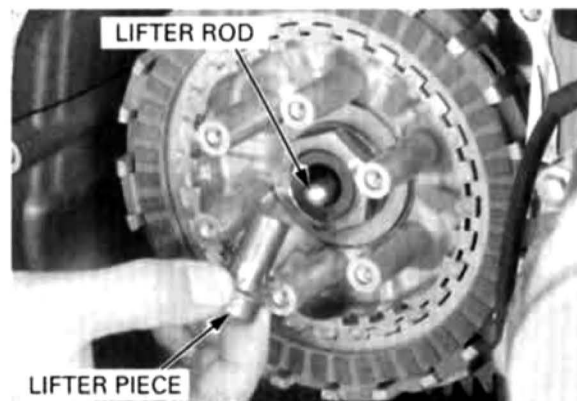
REMOVAL

Remove the clutch cover (page 10-14).

Remove the clutch spring bolts, springs and pressure plate.

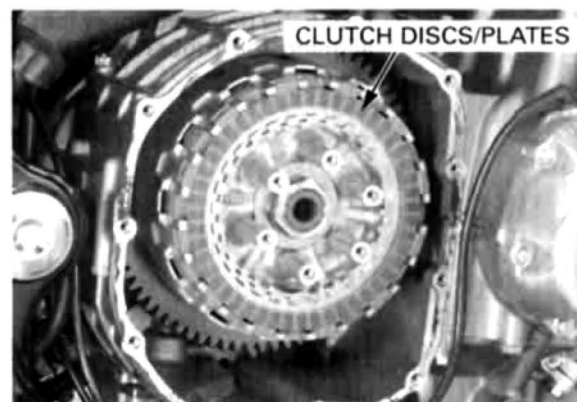


Remove the clutch lifter piece and clutch lifter rod.

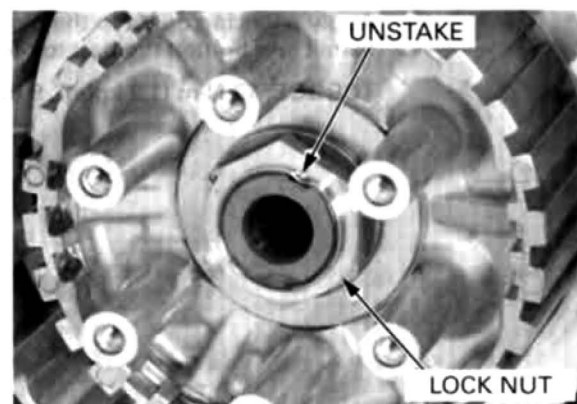


Remove the following:

- Eight clutch discs
- Seven clutch plates
- Judder spring
- Spring seat



Unstake the clutch center lock nut.

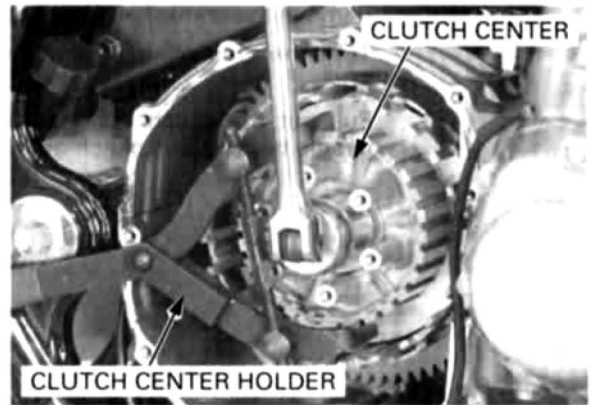


Hold the clutch center with the clutch center holder, then loosen the lock nut.

TOOL:

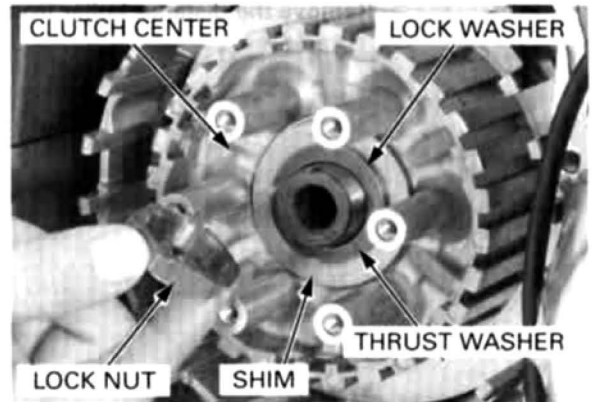
Clutch center holder

07724-0050002

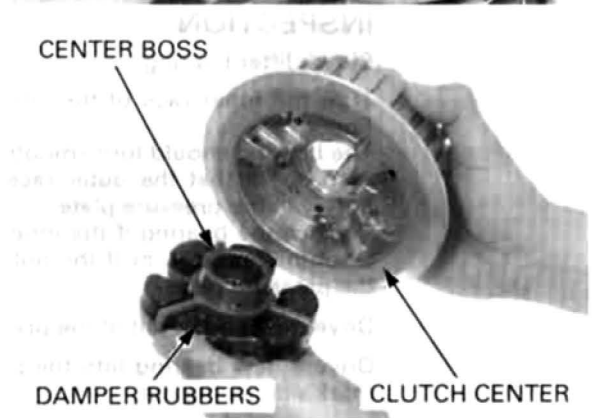


Remove and discard the lock nut.

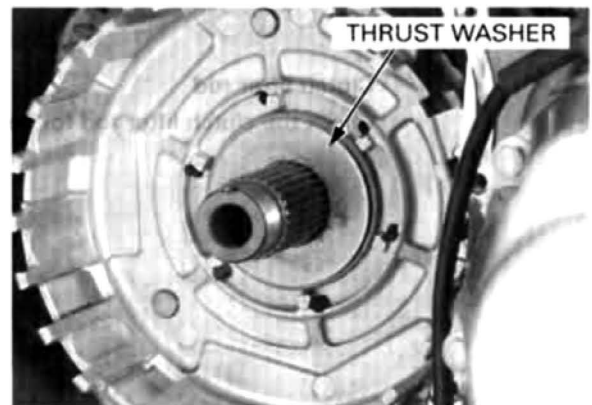
Remove the lock washer, thrust washer, shim and clutch center assembly.



Remove the clutch center boss and damper rubbers from the clutch center.



Remove the thrust washer.

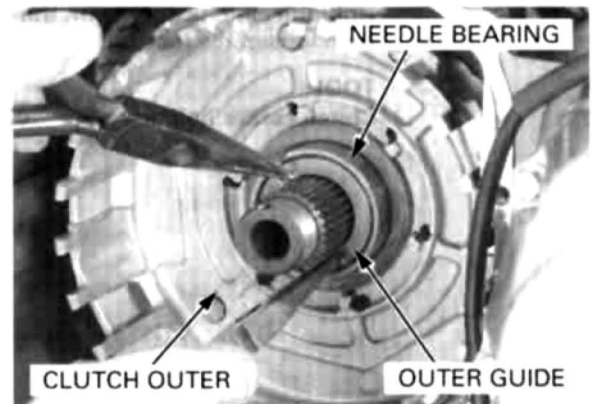


CLUTCH/GEARSHIFT LINKAGE

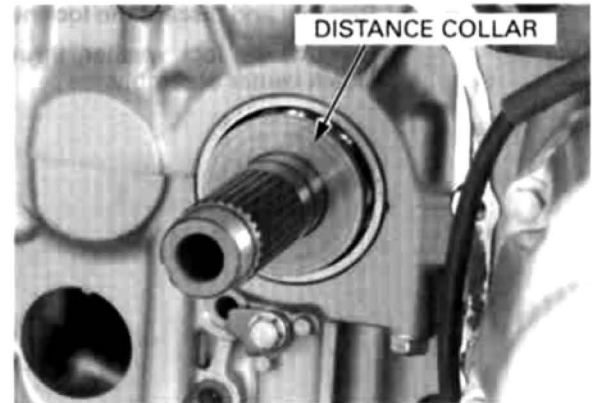
Remove the crankshaft hole cap (page 4-10).

Turn the crankshaft so that the No.1 piston is at TDC.

Pull out the clutch outer guide, then remove the needle bearing and clutch outer.



Remove the distance collar from the mainshaft.



INSPECTION

Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.

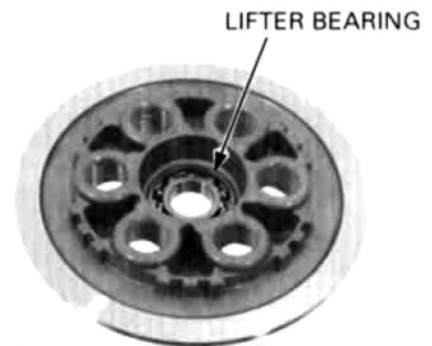
The bearing should turn smoothly and quietly.

Also check that the outer race of the bearing fits tightly in the pressure plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

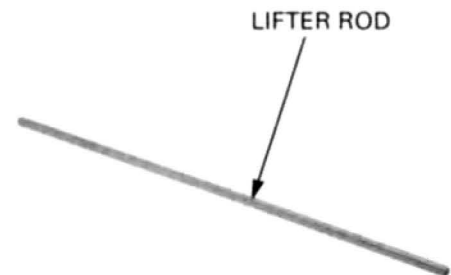
Drive the bearing out of the pressure plate.

Drive a new bearing into the pressure plate with its mark side facing out.



Clutch lifter rod

Check the clutch lifter rod for bent or other damage.

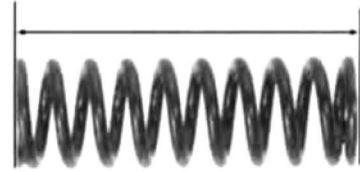


Clutch spring

Replace the clutch spring as a set

Measure the clutch spring free length.

SERVICE LIMIT: 60.3 mm (2.37 in)



Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates. Replace if necessary.



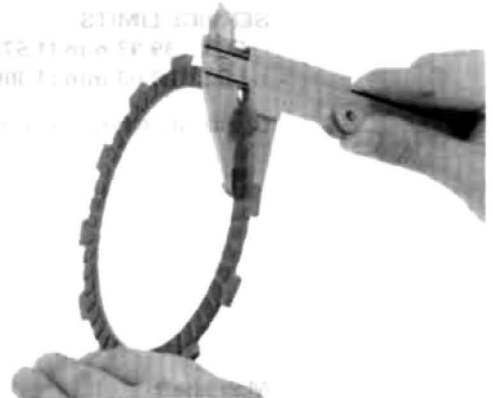
Clutch disc

Replace the clutch discs and plates as a set.

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)

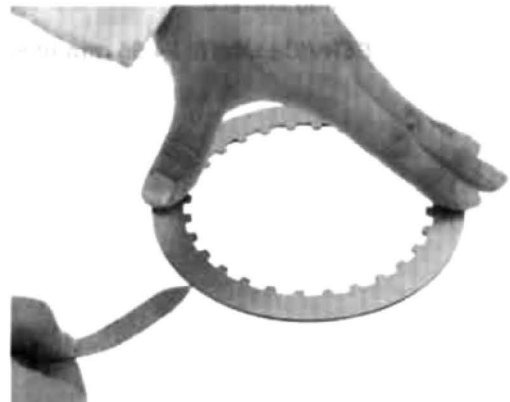


Clutch plate

Replace the clutch discs and plates as a set.

Check each disc plate for warpage on a surface plate using a feeler gauge.

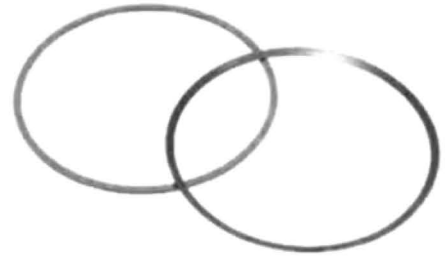
SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH/GEARSHIFT LINKAGE

Judder spring/spring seat

Check the judder spring and spring seat for wear or other damage, replace if necessary.



Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs. Replace if necessary.



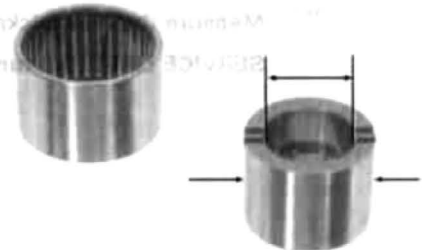
Measure the O.D. and I.D. of the clutch outer guide.

SERVICE LIMITS:

O.D.: 39.93 mm (1.572 in)

I.D.: 28.08 mm (1.106 in)

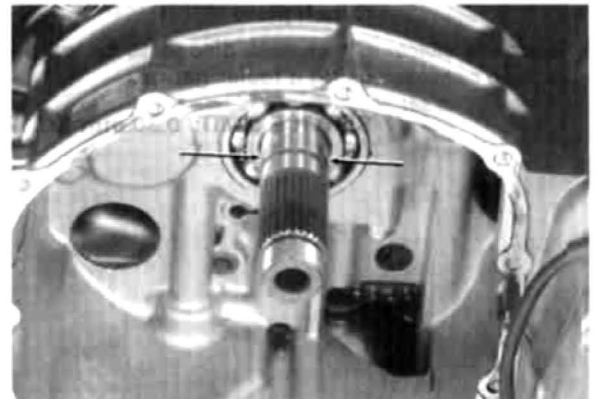
Check the needle bearing for wear or damage.



Mainshaft

Measure the mainshaft O.D. at clutch outer guide sliding surface.

SERVICE LIMIT: 24.96 mm (0.983 in)

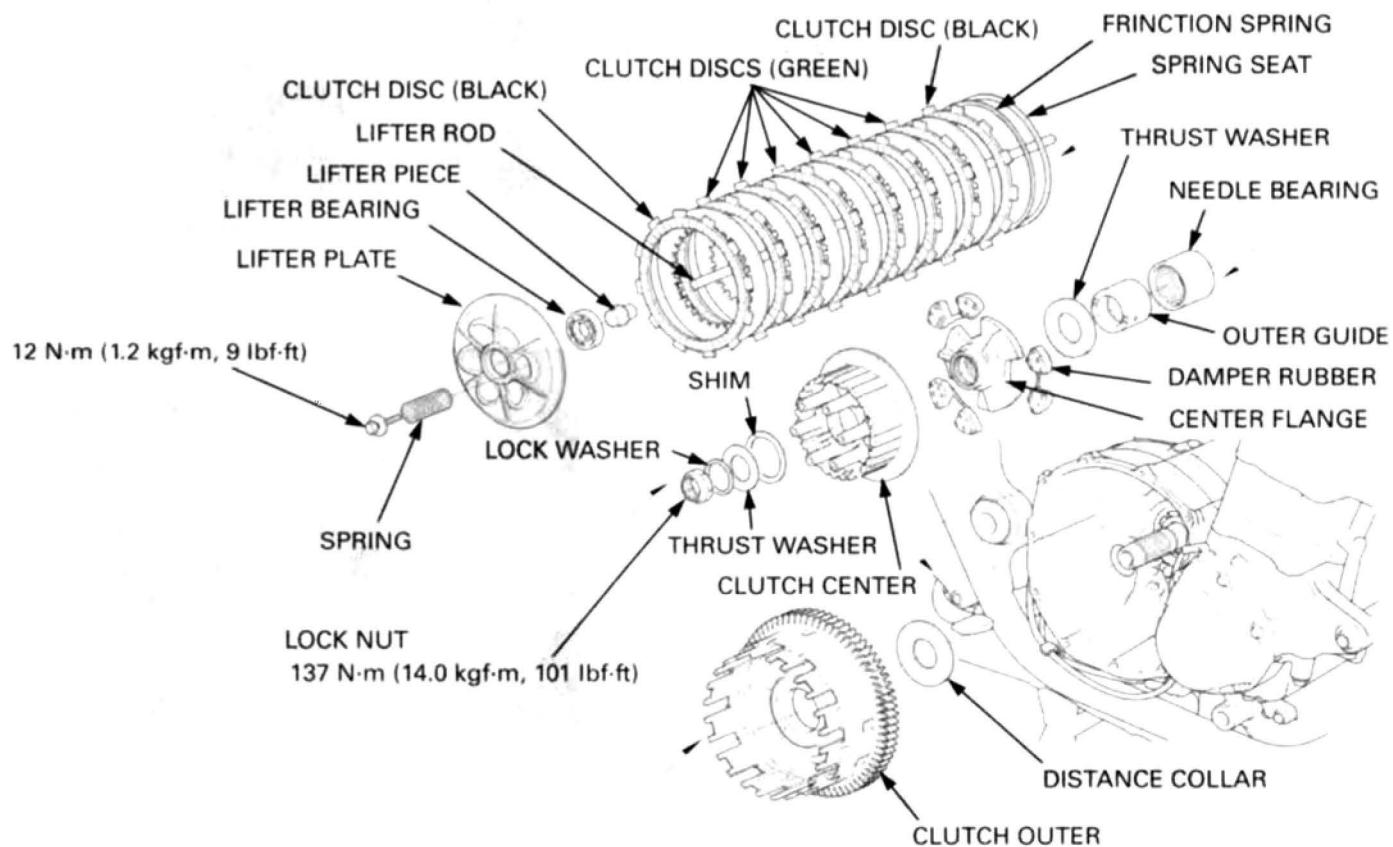


Clutch damper rubber

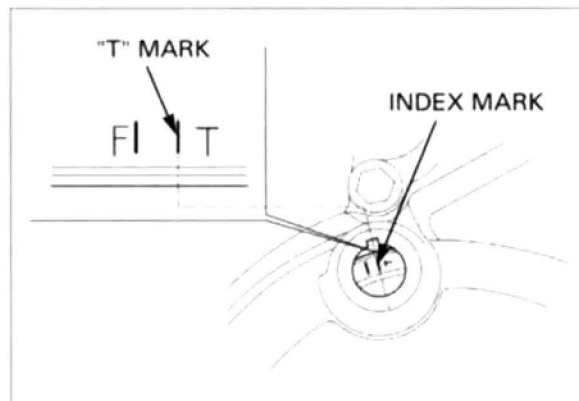
Check the clutch damper rubber for wear or damage, replace them if necessary.



INSTALLATION

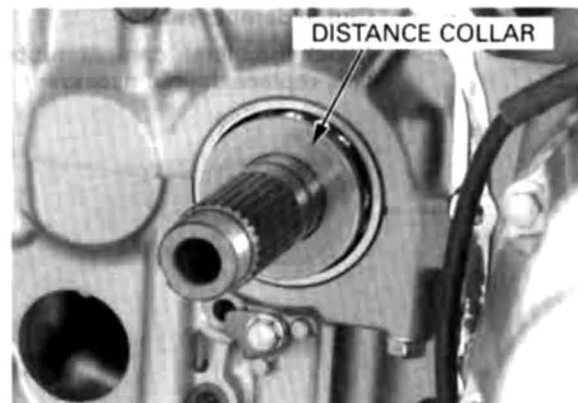


Turn the crankshaft so that the No.1 piston is at TDC.



CLUTCH/GEARSHIFT LINKAGE

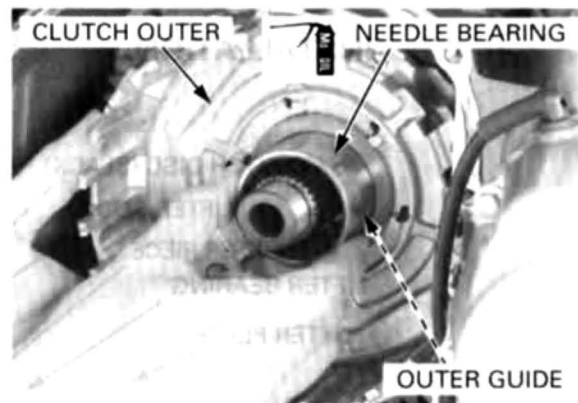
Install the distance collar onto the mainshaft.



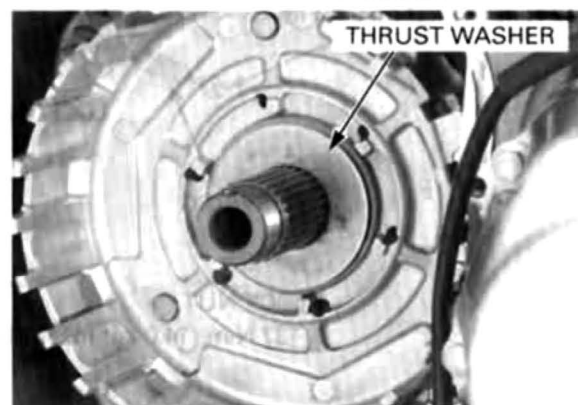
Apply molybdenum disulfide oil to the outer surface of the needle bearing.

Install the clutch outer and needle bearing.

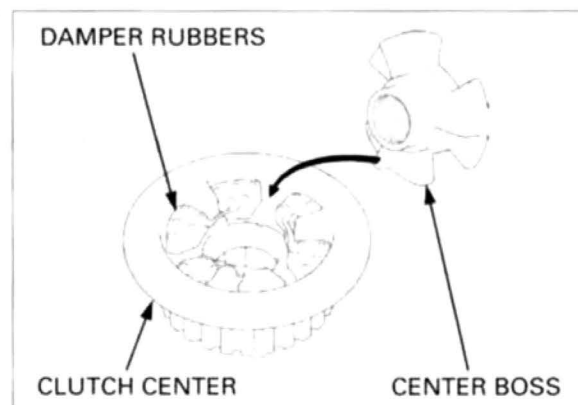
Align the primary drive gear and sub-gear teeth with a screwdriver, install the clutch outer guide.



Install the thrust washer onto the clutch outer.



Install the clutch damper rubbers and clutch center boss into the clutch center.

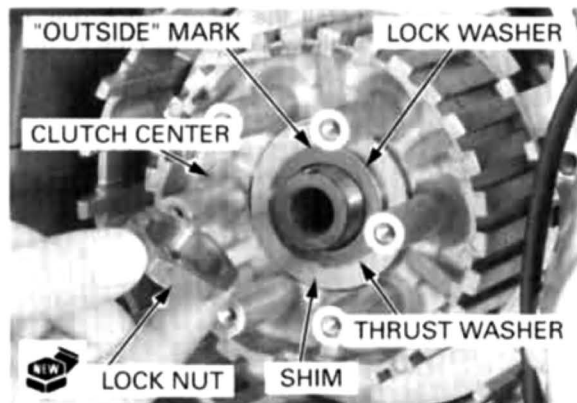


Install the clutch center assembly.

Install the shim and thrust washer.

Install the lock washer with its "OUTSIDE" mark facing out.

Install the new lock nut.



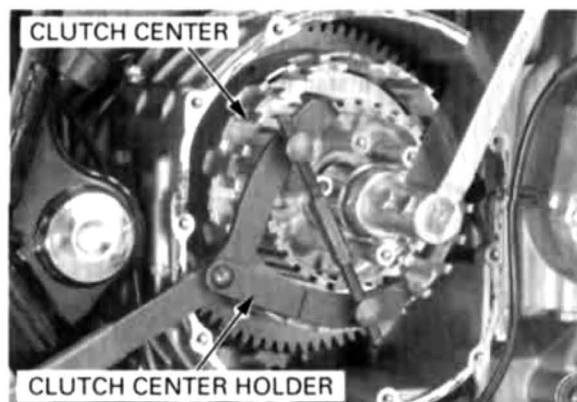
Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:

Clutch center holder

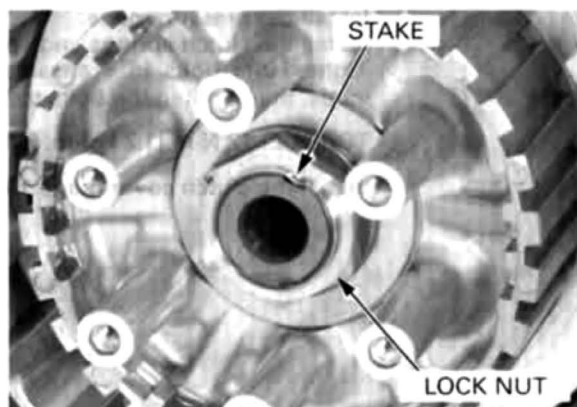
07724-0050002
(Equivalent commercially available)

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)



Be careful not to damage the mainshaft threads.

Stake lock nut into the mainshaft groove with a punch.



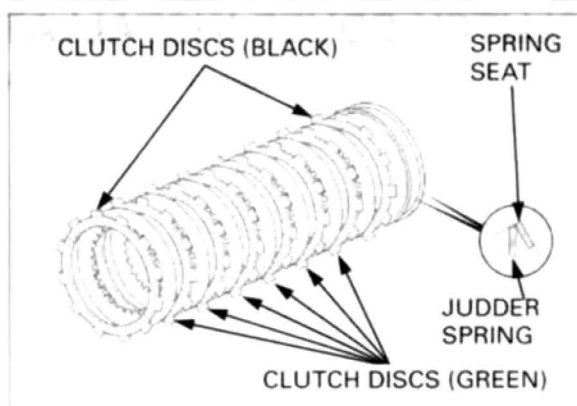
Note the direction of the judder spring.

Install the clutch spring seat and clutch judder spring.

Coat the clutch discs and plates with clean engine oil.

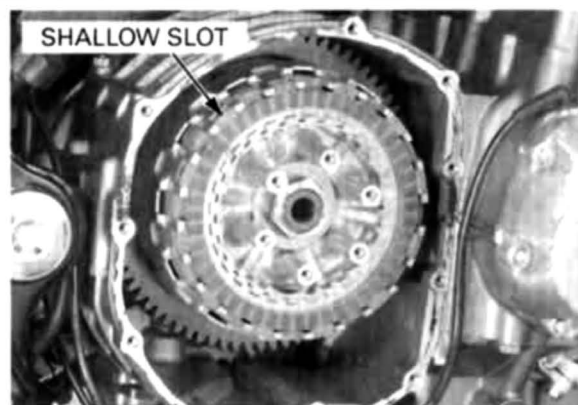
Stack the clutch discs and plates alternately.

Install the discs colored "Black" on both ends.



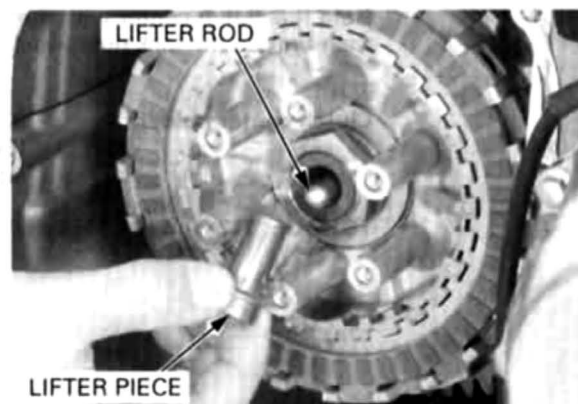
CLUTCH/GEARSHIFT LINKAGE

Install the outer clutch disc colored "Black" in the shallow slot on the clutch outer.



Apply oil to the clutch lifter rod and lifter piece contact surface.

Install the clutch lifter rod and lifter piece.



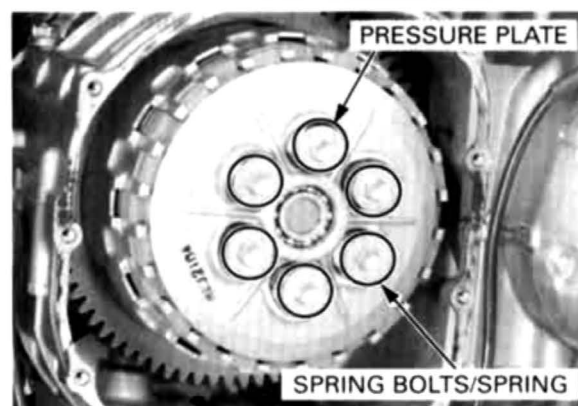
Install the pressure plate.

Install the clutch springs and spring bolts.

Tighten the bolts in a crisscross pattern in 2 - 3 steps, then tighten the bolts to the specified torque.

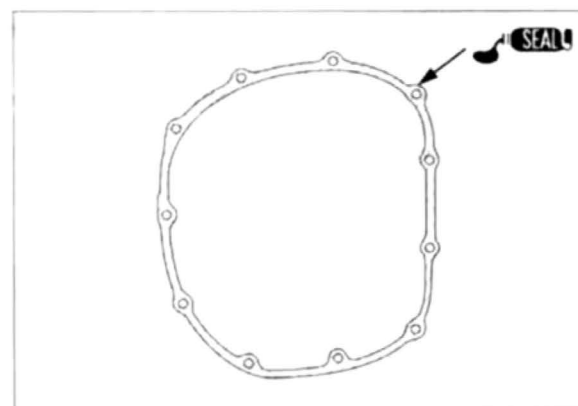
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the clutch cover (page 10-24).



CLUTCH COVER INSTALLATION

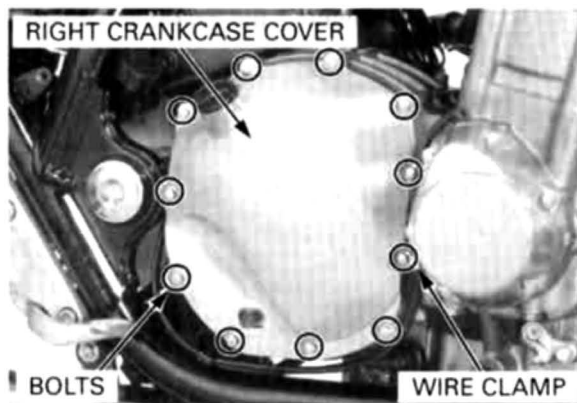
Apply sealant to the mating surface of the clutch cover.



Install the clutch cover, wire clamp and mounting bolts.

Tighten the clutch cover bolts in a crisscross pattern in 2-3 steps.

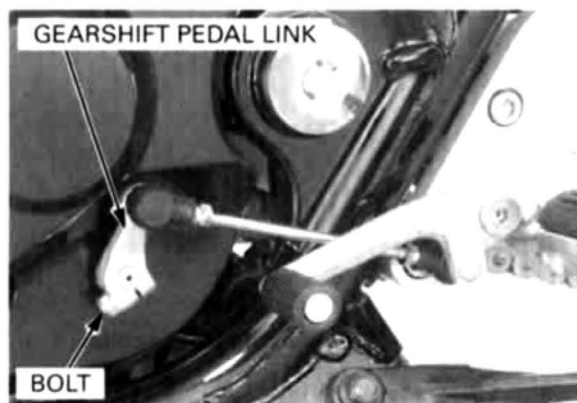
Pour the recommended engine oil (page 4-14).



GEARSHIFT LINKAGE

REMOVAL

Remove the bolt and gearshift pedal link.

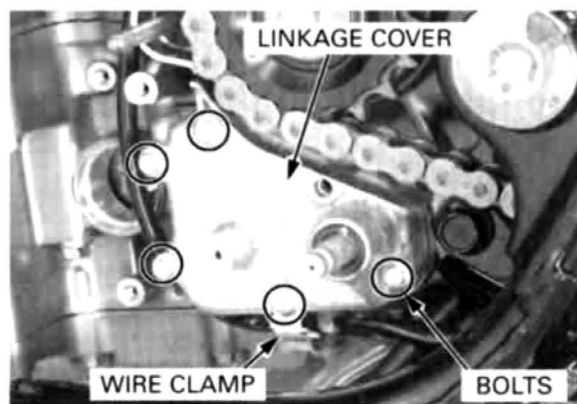


Remove the bolts and left crankcase side cover.



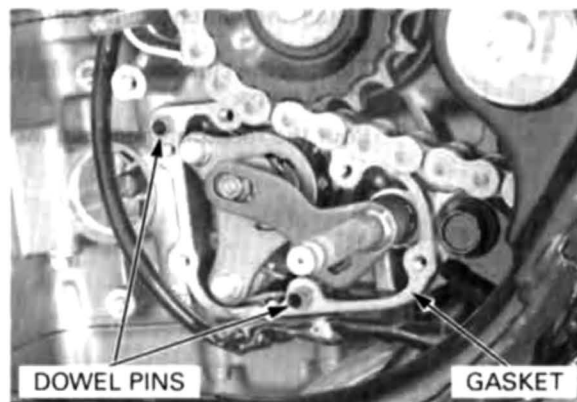
Remove the left crankcase rear cover (page 8-4).

Remove the bolts, wire clamp and gearshift linkage cover.

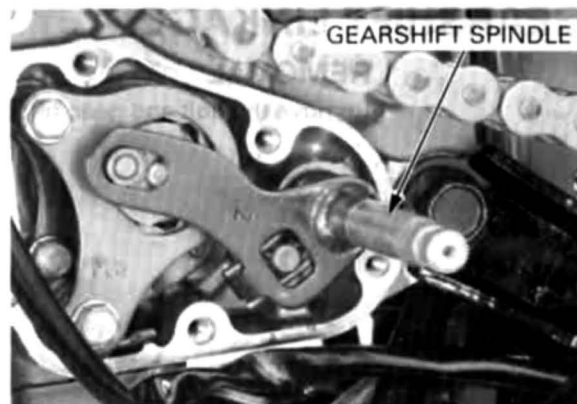


CLUTCH/GEARSHIFT LINKAGE

Remove the gasket and dowel pins.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.

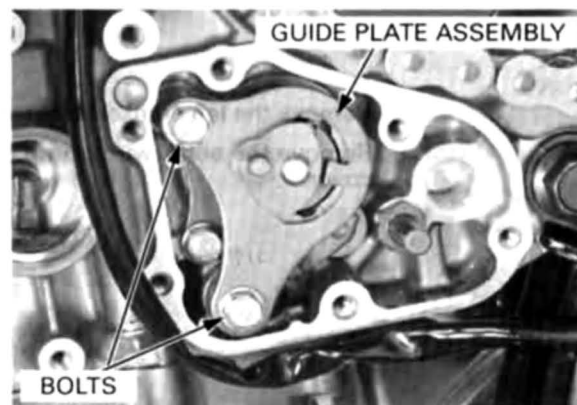


Remove the shifter collar.



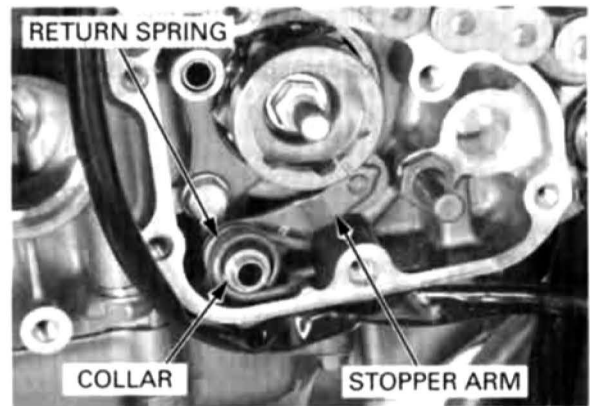
Remove the guide plate bolts.

Remove the guide plate, drum shifter, ratchet pawls, plungers and springs as an assembly.



Remove the following:

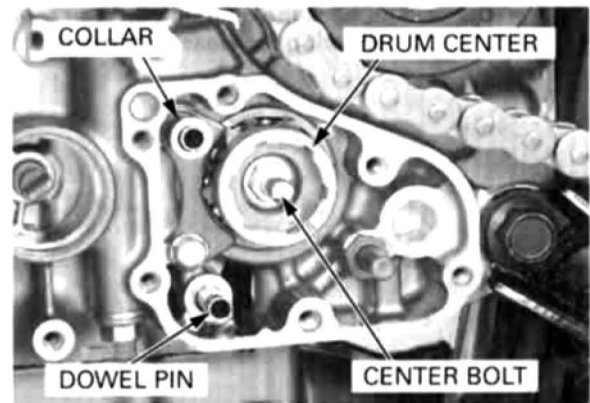
- Return spring
- Collar
- Shift drum stopper arm



Remove the shift drum center bolt, then remove the shift drum center.

Remove the following:

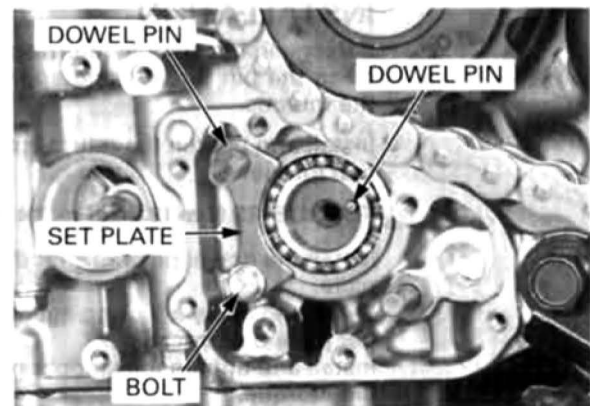
- Guide plate dowel pin
- Collar
- Washer



Remove the dowel pin from the set plate.

Remove the dowel pin from the shift drum.

Remove the bolt and shift drum bearing set plate.



INSPECTION

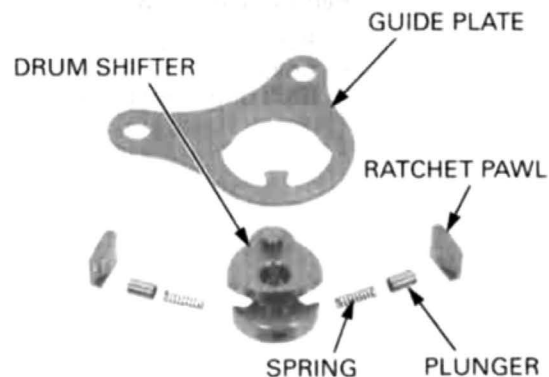
Check the gearshift spindle for wear, damage or bending.

Check the return spring for fatigue or damage.

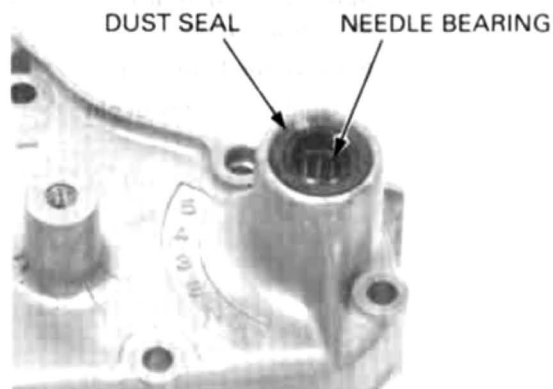


CLUTCH/GEARSHIFT LINKAGE

Disassemble the guide plate assembly.
Check the ratchet pawl, plunger and spring for wear or damage, replace if necessary.



Check the gearshift linkage cover oil seal and needle bearing for wear or damage.



INSTALLATION

If the gearshift spindle return spring pin is removed, clean the pin threads and apply a locking agent to the threads.

Install and tighten the return spring pin to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 14 lbf·ft)

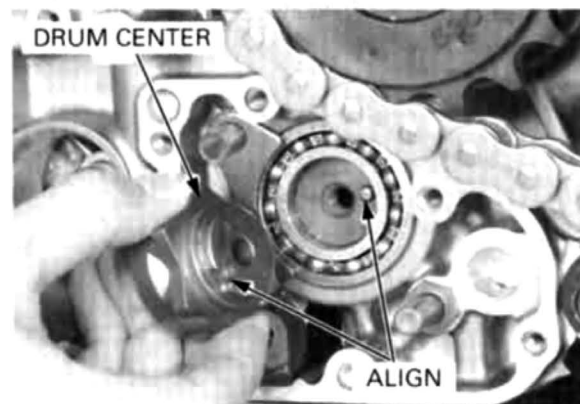
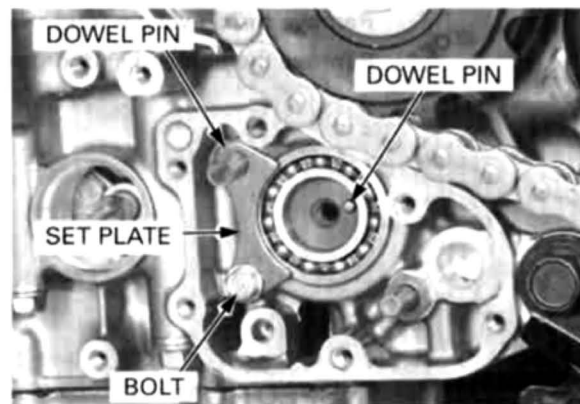
Install the dowel pin and shift drum bearing stopper plate.

Clean and apply a locking agent to the bearing stopper plate bolt threads.

Install and tighten the stopper plate bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the dowel pin onto the shift drum.



If the shift drum move into the crankcase, temporarily remove the clutch assembly and push the shift drum from the right side.

Install the gearshift cam while aligning its cutout with the dowel pin on the shift drum.

Apply a locking agent to the shift drum center bolt threads.

Install and tighten the shift drum center bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Install the following:

- Washer
- Guide plate dowel pin
- Collar

Install the following:

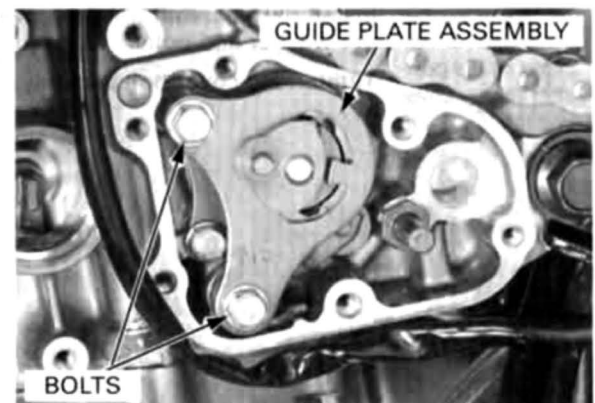
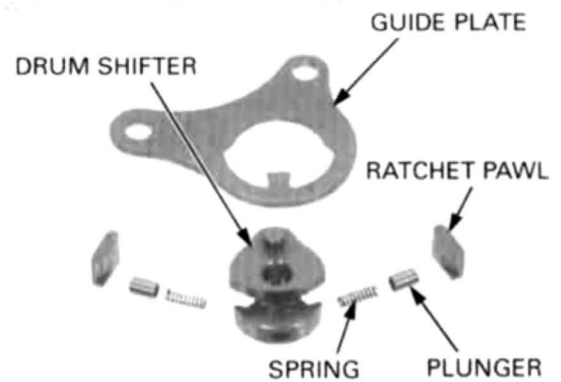
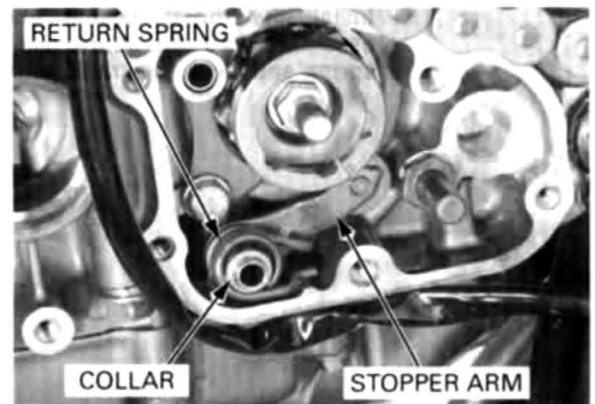
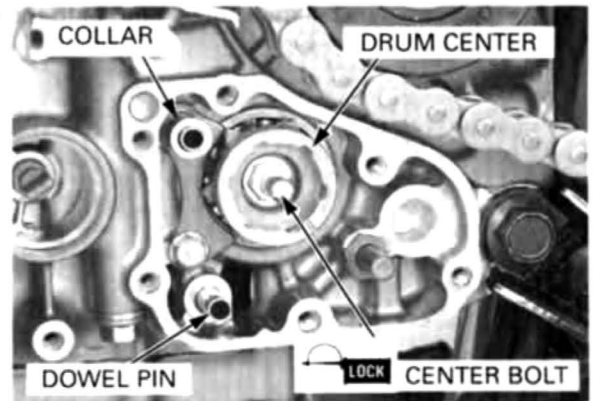
- Collar
- Shift drum stopper arm
- Return spring

Apply engine oil to the drum shifter, ratchet pawls, plungers and springs.

Assemble the guide plate.

Note the direction of the ratchet pawl.

Install the guide plate assembly while aligning the drum shifter hole with the shift drum center bolt. Make sure the dowel pin is installed properly, install and tighten the guide plate bolts.

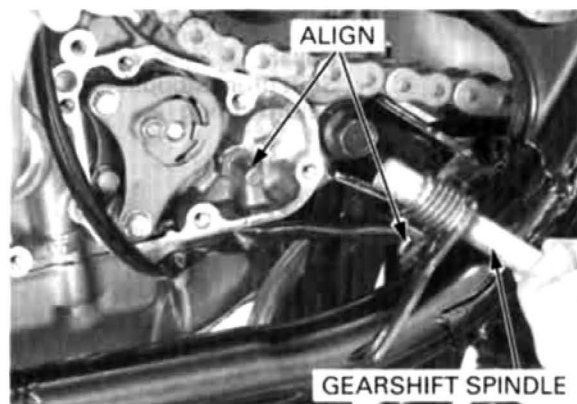


CLUTCH/GEARSHIFT LINKAGE

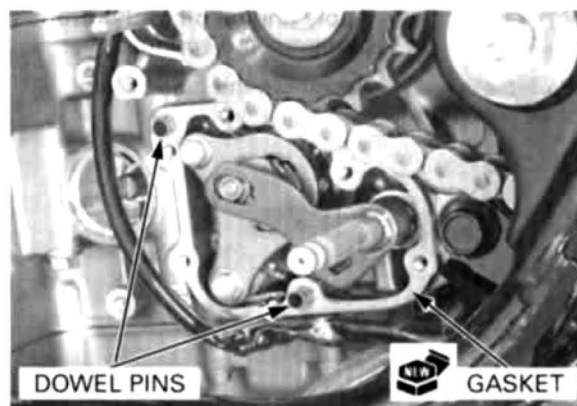
Install the shifter collar onto the drum shifter.



Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.



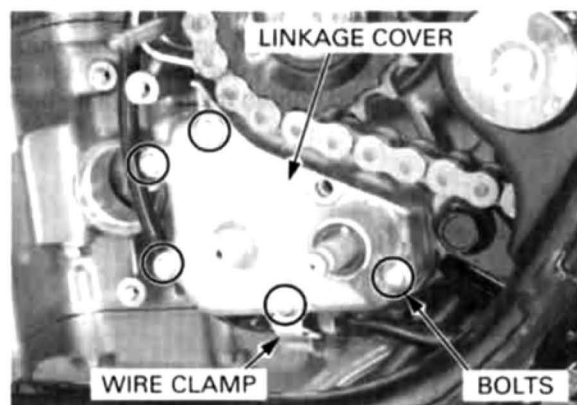
Install the dowel pins and new gasket.



The copper washer location is indicated on the gearshift linkage cover using the '△' mark.

Install the gearshift linkage cover, wire clamp, copper washer and bolts.

Tighten the cover bolt securely.



Install the following:

- Left crankcase rear cover (page 8-12)
- Clutch slave cylinder (page 10-14)
- Water pump (page 7-16)

Install the left crankcase side cover and tighten the bolts to the specified torque.

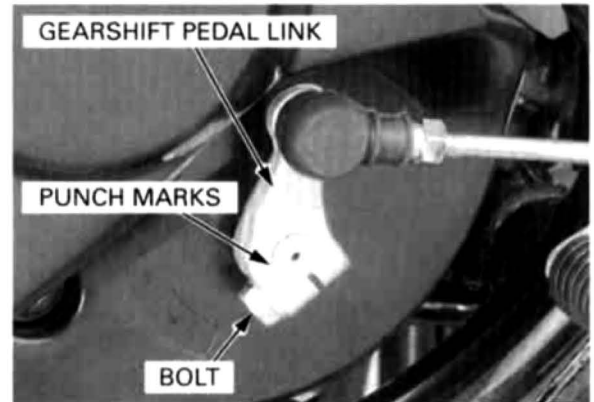
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



Install the gearshift pedal link to the gearshift spindle while aligning the punch marks.

Install and tighten the pinch bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

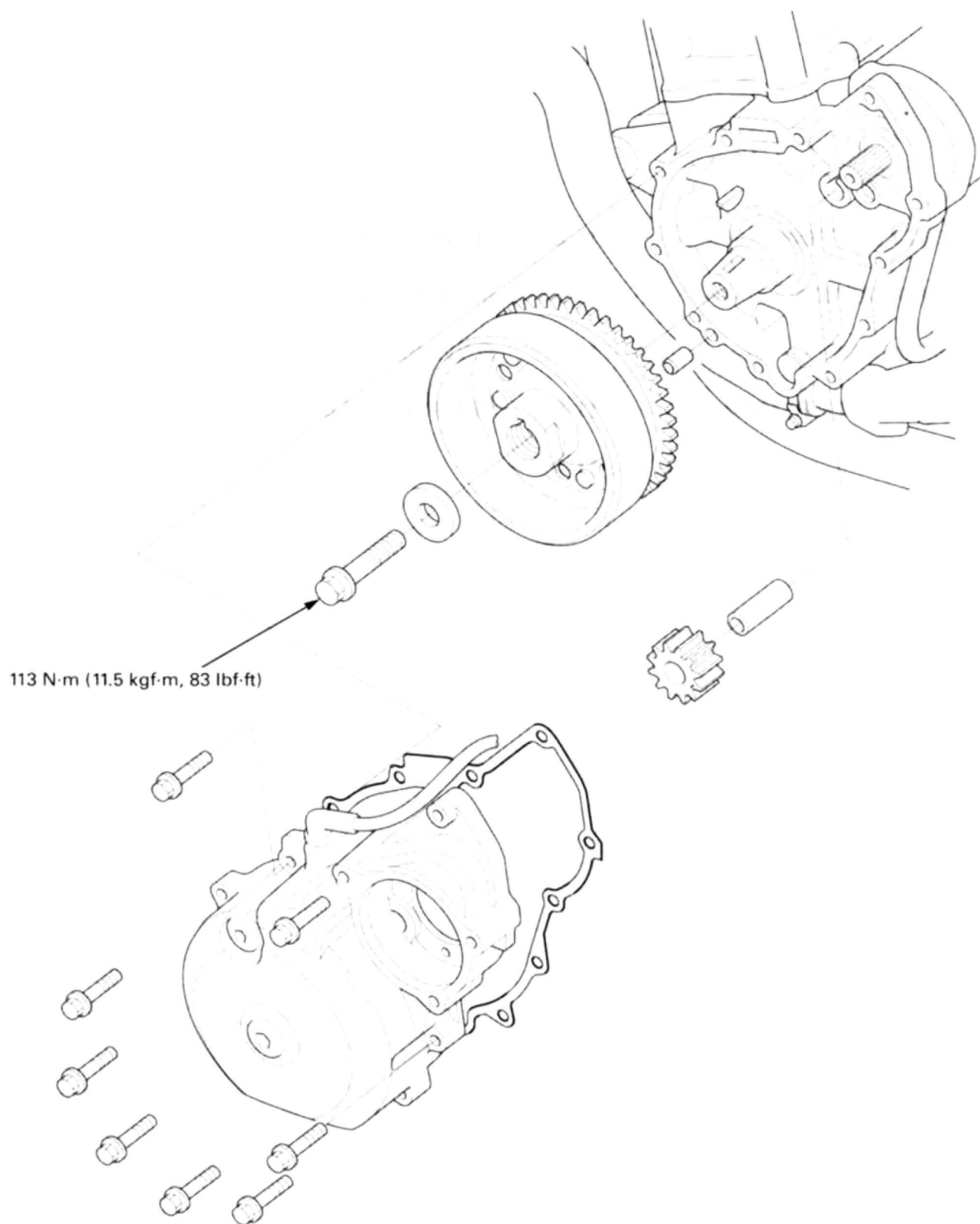


11. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION	11-2	FLYWHEEL REMOVAL	11-6
SERVICE INFORMATION	11-3	STARTER CLUTCH	11-7
TROUBLESHOOTING	11-3	FLYWHEEL INSTALLATION.....	11-10
ALTERNATOR COVER REMOVAL.....	11-4	ALTERNATOR COVER INSTALLATION	11-11
STATOR.....	11-4		

ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. All service can be done with the engine installed in the frame.
- Refer to procedures for alternator stator inspection (page 16-6).
- Refer to procedures for starter motor servicing (page 18-6).

SPECIFICATIONS

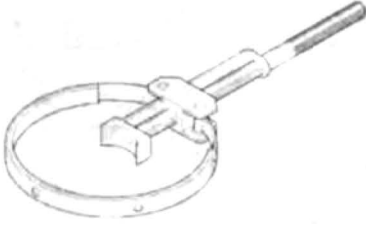
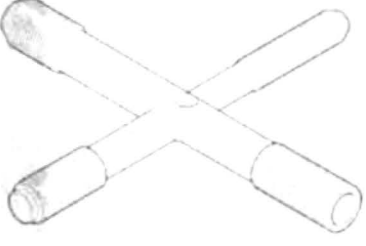
Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.684 (2.0348)

TORQUE VALUES

Alternator wire clamp socket bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Starter one-way clutch outer socket bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply a locking agent to the threads
Flywheel flange bolt	113 N·m (11.5 kgf·m, 83 lbf·ft)	Apply oil to the threads
Alternator stator mounting socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOL

<p>Flywheel holder 07725-0040000</p> 	<p>Rotor puller 07733-0020001</p> 
---	--

TROUBLESHOOTING

Engine does not turn

- Faulty starter clutch
- Damaged reduction gear/shaft

ALTERNATOR COVER REMOVAL

Remove the following:

- Left side cover (page 3-4)
- Left crankcase rear cover (page 8-4)
- Starter motor (page 18-6)

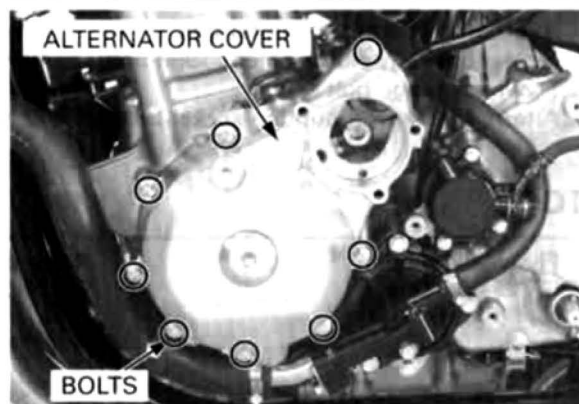
Disconnect the alternator 3P (Natural) connector.

The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.

Remove the alternator cover SH bolts and alternator cover.

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.

Remove the gasket and dowel pin.

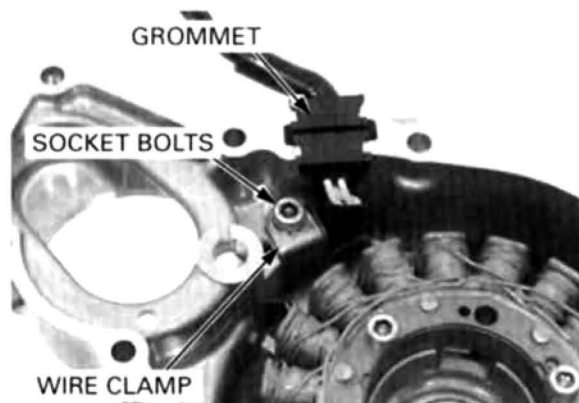


STATOR

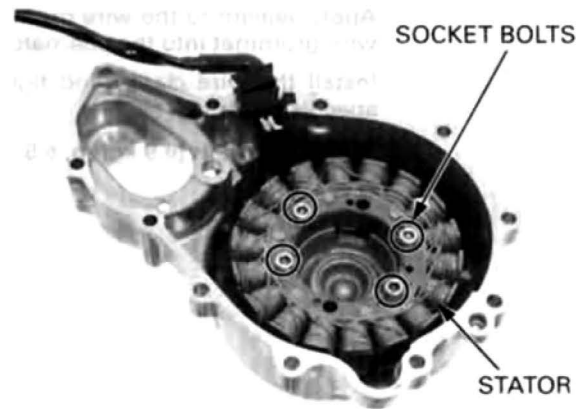
REMOVAL

Remove the alternator wire grommet from the alternator cover.

Remove the socket bolt and stator wire clamp.



Remove the socket bolts and stator.



INSTALLATION

9 N·m (0.9 kgf·m, 6.5 lbf·ft)

12 N·m (1.2 kgf·m, 9 lbf·ft)

WIRE CLAMP

SEAL

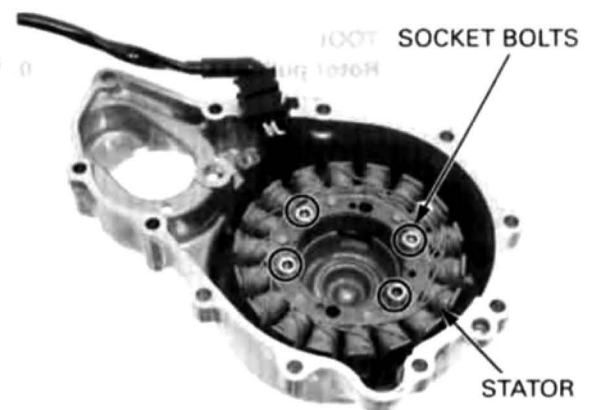
STATOR

ALTERNATOR COVER

Install the stator into the alternator cover.

Install and tighten the stator mounting socket bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

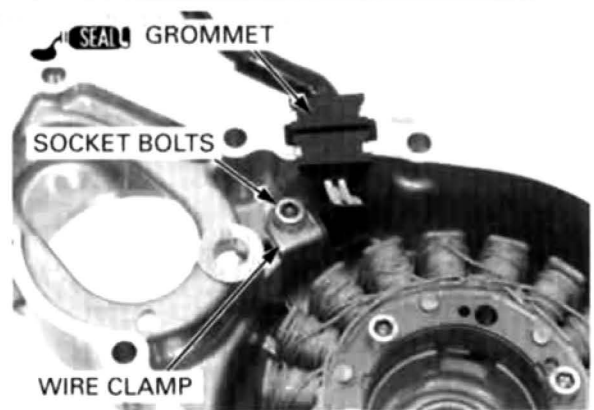


ALTERNATOR/STARTER CLUTCH

Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely.

Install the wire clamp and tighten the bolt to the specified torque.

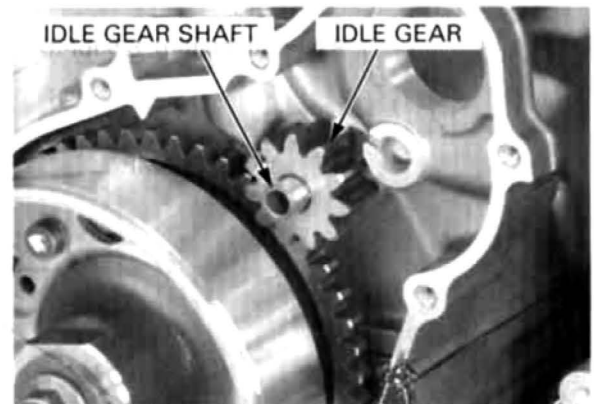
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



FLYWHEEL REMOVAL

Remove the alternator cover (page 11-4).

Remove the starter idle gear shaft and idle gear.



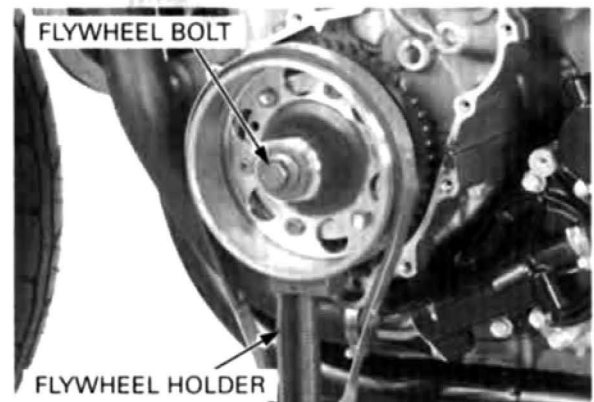
Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

TOOL:

Flywheel holder

07725-0040000

Remove the washer.

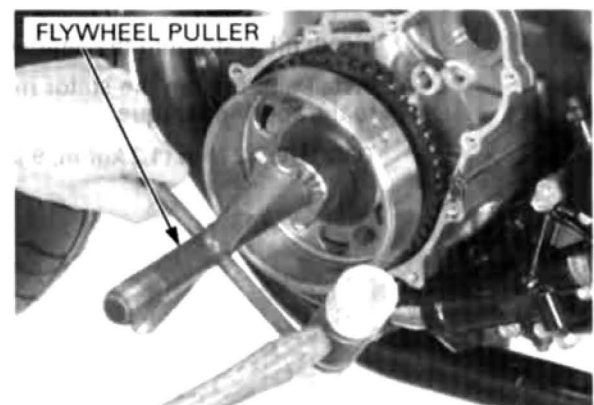


Remove the flywheel using the special tool.

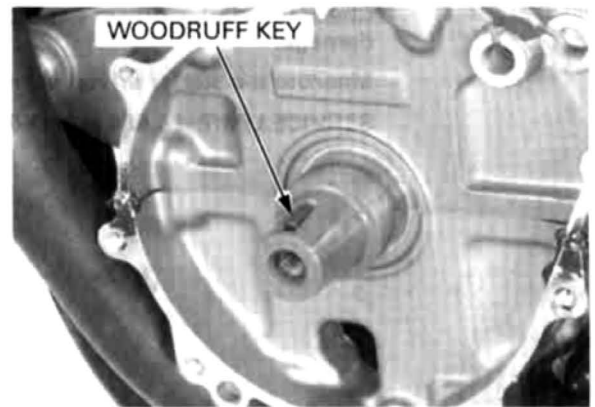
TOOL:

Rotor puller

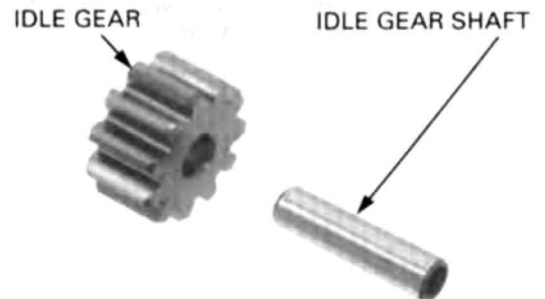
07733-0020001



Remove the woodruff key.



Check the starter idle gear and shafts for wear or damage.



STARTER CLUTCH

INSPECTION

Check the operation of the one-way clutch by turning the driven gear.

You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.

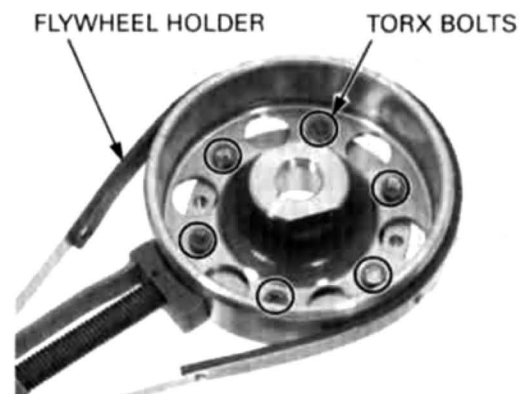
Hold the flywheel with a flywheel holder, and remove the starter clutch mounting socket bolts.

TOOL:

Flywheel holder

07725-0040000

Remove the starter one-way clutch assembly.



ALTERNATOR/STARTER CLUTCH

Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

SERVICE LIMIT: 51.684 mm (2.0348 in)



Check the one-way clutch for wear or damage and replace if necessary.

CLUTCH OUTER

ONE-WAY CLUTCH



ASSEMBLY

16 N·m (1.6 kgf·m, 12 lbf·ft)

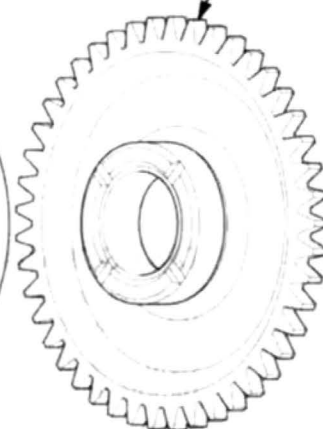
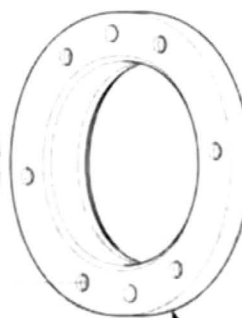
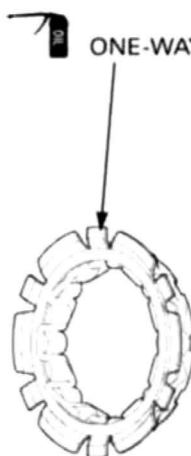
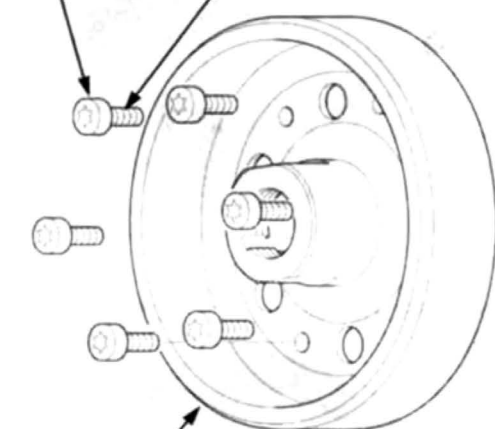


ONE-WAY CLUTCH

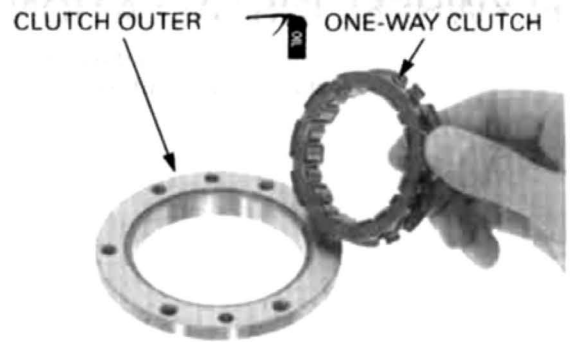
DRIVEN GEAR

FLYWHEEL

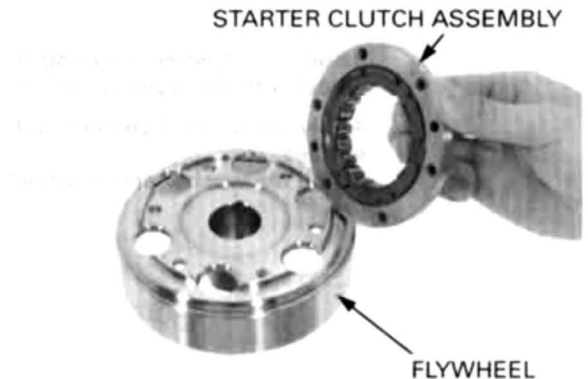
CLUTCH OUTER



Apply engine oil to the one-way clutch contacting surfaces.
Install the one-way clutch into the starter clutch outer with the flange side facing out.



Install the starter one-way clutch assembly onto the flywheel.



Apply a locking agent to the starter clutch outer mounting socket bolt threads.
Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting socket bolts.

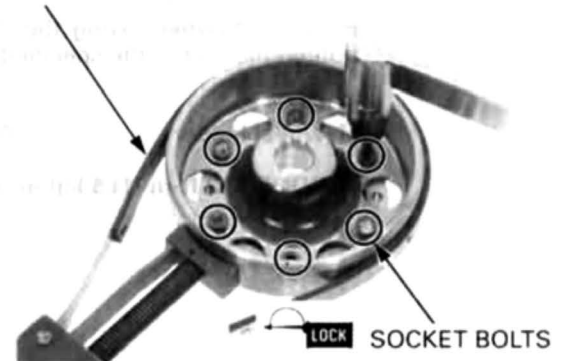
TOOL:

Flywheel holder

07725-0040000

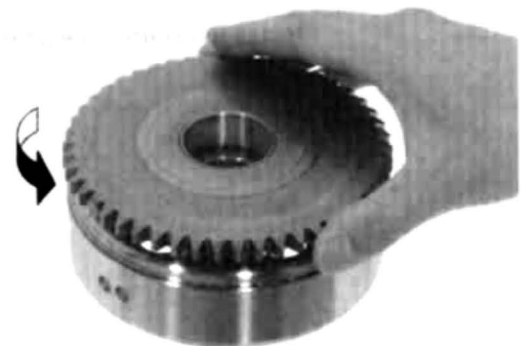
TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

FLYWHEEL HOLDER



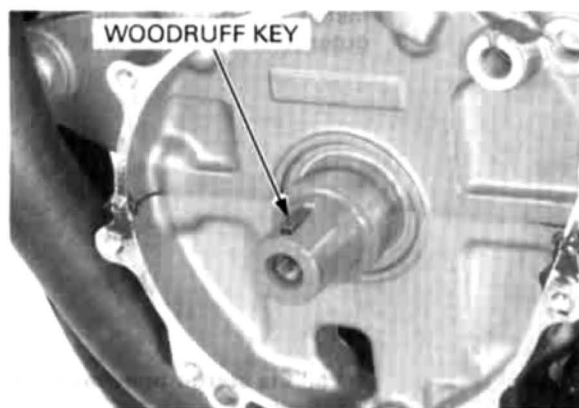
Install the starter driven gear into the one-way clutch while turning it counterclockwise.

Recheck the one-way clutch operation.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



FLYWHEEL INSTALLATION

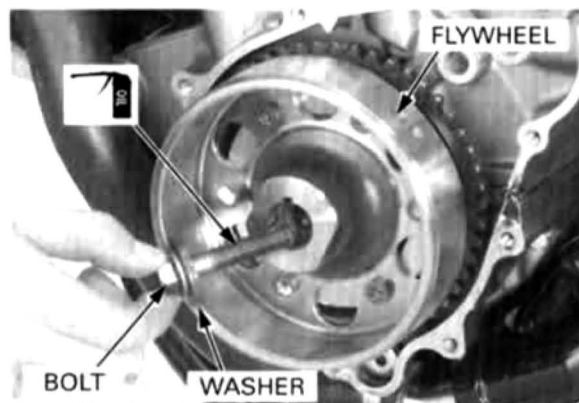
Clean any oil from the crankshaft taper.
Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

Apply oil to the flywheel bolt threads and seating surface.

Install the washer and flywheel bolt.

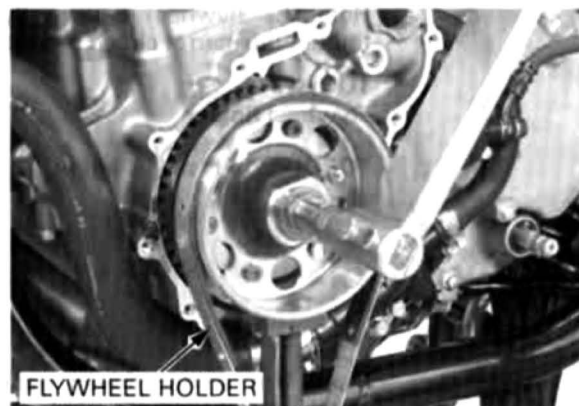


Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

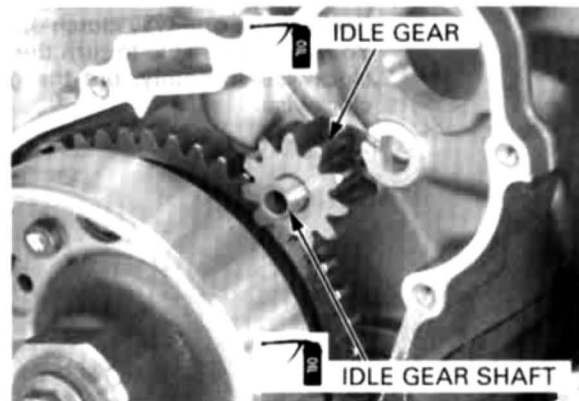
TOOL:

Flywheel holder 07725-0040000

TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)

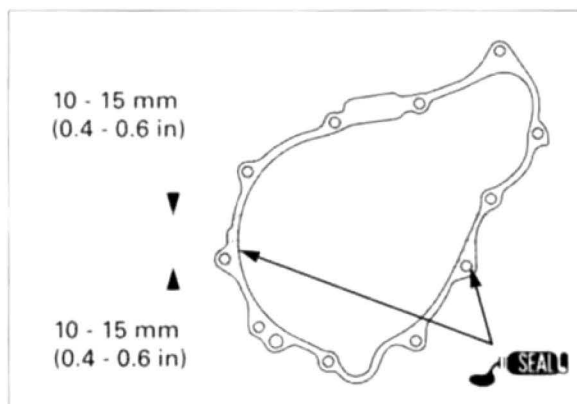


Install the starter idle gear and idle gear shaft.

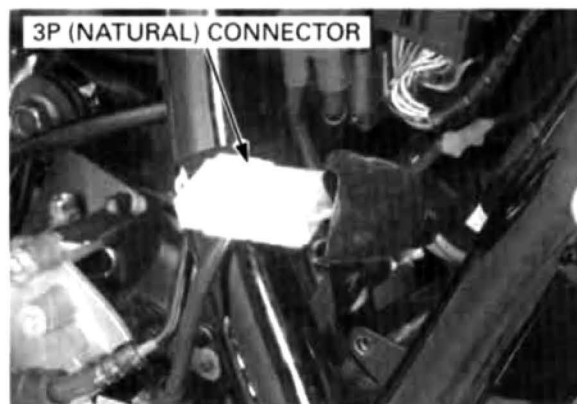
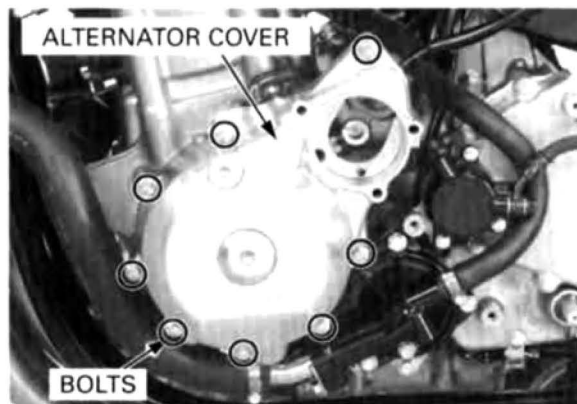
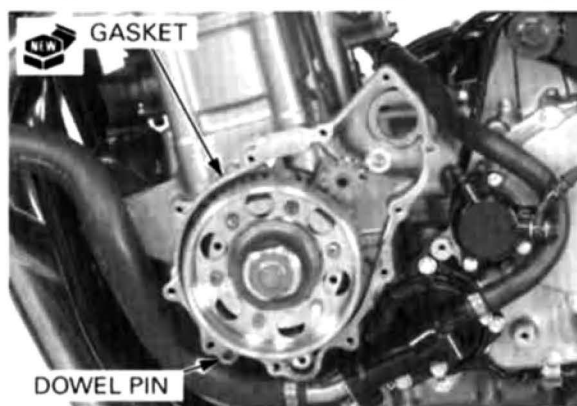


ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pin and new gasket.



The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.

Install the alternator cover.

Install and tighten the bolts securely.

Route the alternator wire properly (page 1-23).

Connect the alternator 3P (Natural) connector.

Install the following:

- Starter motor (page 18-13)
- Left crankcase rear cover (page 8-12)
- Left side cover (page 3-4)

12. CRANKSHAFT/TRANSMISSION/BALANCER

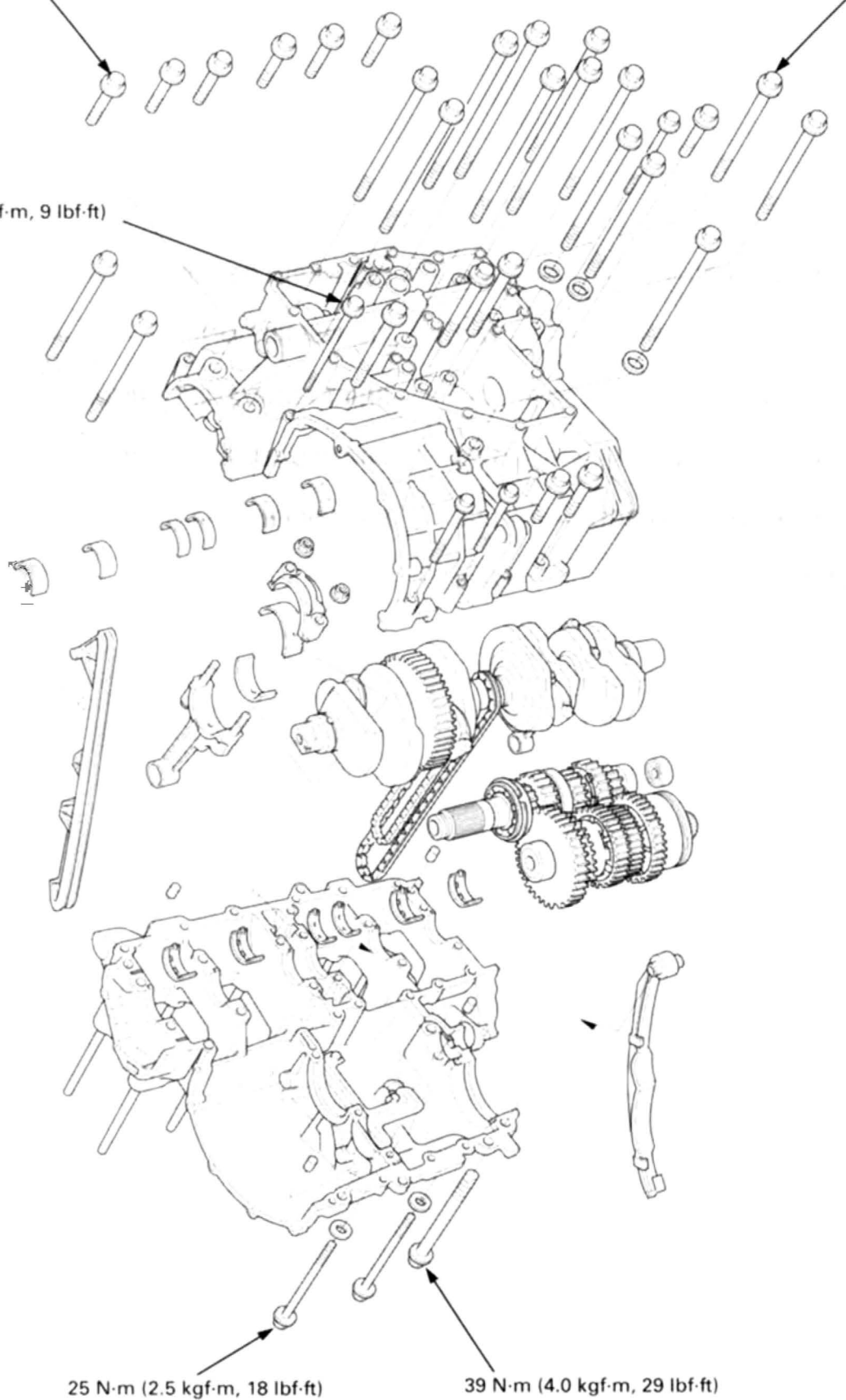
COMPONENT LOCATION	12-2	CRANKPIN BEARING	12-13
SERVICE INFORMATION	12-3	TRANSMISSION	12-15
TROUBLESHOOTING	12-4	SHIFT FORK/SHIFT DRUM	12-23
CRANKCASE SEPARATION	12-5	CRANKCASE ASSEMBLY	12-26
CRANKSHAFT/CONNECTING ROD	12-5	BALANCER	12-27
MAIN JOURNAL BEARING	12-10		

COMPONENT LOCATION

25 N·m (2.5 kgf·m, 18 lbf·ft)

33 N·m (3.4 kgf·m, 25 lbf·ft)

12 N·m (1.2 kgf·m, 9 lbf·ft)



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - Transmission (page 12-15)
 - Crankshaft (page 12-5)
 - Connecting rod (page 12-5)
- The following components must be removed before separating the crankcase:
 - Alternator (page 11-4) / flywheel (page 11-6)
 - Clutch (page 10-16) / gearshift linkage (page 10-25)
 - Cylinder head (page 9-20)
 - Engine (page 8-5)
 - Oil pan (page 5-6), oil pump (page 5-9) and oil cooler (page 5-14)
 - Starter motor (page 18-6)
 - Water pump (page 7-15)
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces, Wipe off excess sealant thoroughly.

SPECIFICATIONS

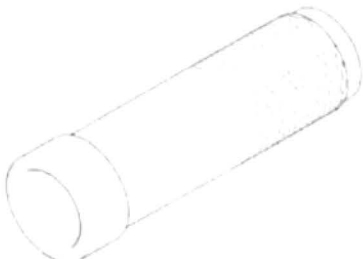

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance	0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.08 (0.003)
	Main journal bearing oil clearance	0.016 – 0.040 (0.0006 – 0.0016)	0.08 (0.003)
	Runout	–	0.03 (0.001)
Shift fork, fork shaft	I.D.	14.000 – 14.021 (0.5512 – 0.5520)	14.04 (0.553)
	Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.	13.957 – 13.968 (0.5495 – 0.5499)	13.90 (0.547)
Transmission	Gear I.D.	M4,M5	31.000 – 31.025 (1.2205 – 1.2215)
		C1	26.007 – 26.028 (1.0239 – 1.0247)
		C2, C3	33.000 – 33.025 (1.2992 – 1.3002)
	Gear busing O.D.	M4, M5	30.975 – 30.985 (1.2195 – 1.2199)
		C2	32.955 – 32.980 (1.2974 – 1.2984)
		C3	32.950 – 32.975 (1.2972 – 1.2982)
	Gear-to-bushing clearance	M4, M5	0.025 – 0.075 (0.0010 – 0.0030)
		C2	0.020 – 0.070 (0.0008 – 0.0028)
		C3	0.025 – 0.075 (0.0010 – 0.0030)
	Gear bushing I.D.	M4	28.000 – 28.021 (1.1024 – 1.1032)
		C2	29.985 – 30.006 (1.1805 – 1.1813)
	Mainshaft O.D.	at M4	27.980 – 27.993 (1.1016 – 1.1021)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)
	Bushing-to-shaft clearance	M4	0.007 – 0.041 (0.0028 – 0.0016)
		C2	0.010 – 0.056 (0.0004 – 0.0022)

TOEQUE VALUES

Crankcase main journal 9 mm bolt	33 N·m (3.4 kgf·m, 25 lbf·ft)	Apply molybdenum disulfide oil (after removing anti-rust oil additive)
Crankcase bolt,		
10 mm	39 N·m (4.0 kgf·m, 29 lbf·ft)	
8 mm	25 N·m (2.5 kgf·m, 18 lbf·ft)	
6 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Lower crankcase socket bolt, 20 mm	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent
Lower crankcase socket bolt, 10 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent
Connecting rod nut	41 N·m (4.2 kgf·m, 30 lbf·ft)	Apply oil to the threads
Lower crankcase socket bolt, 10 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Balancer shaft special bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pass pipe plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent

TOOLS

<p>Inner driver C 07746-0030100</p> 	<p>Attachment, 30 mm I.D. 07746-0030300</p> 
---	---

TROUBLESHOOTING

Hard to shift

- Improper clutch operation (page 10-16)
- Incorrect transmission oil weight
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam groove
- Bent gearshift spindle

Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring

Excessive engine noise

- Worn or damaged transmission gear
- Worn or damaged transmission bearings
- Worn main journal bearings
- Worn crankpin bearings

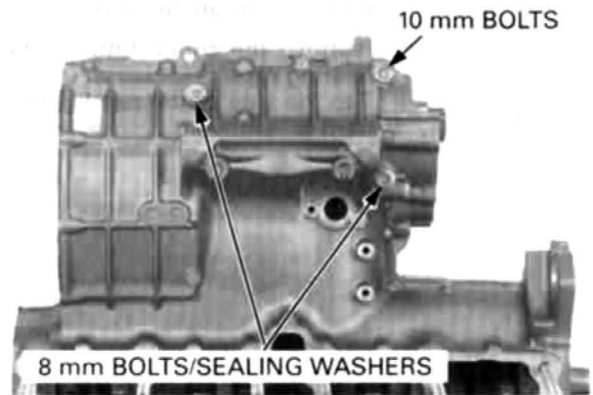
Engine vibration

- Excessive crankshaft runout
- Incorrect balancer timing

CRANKCASE SEPARATION

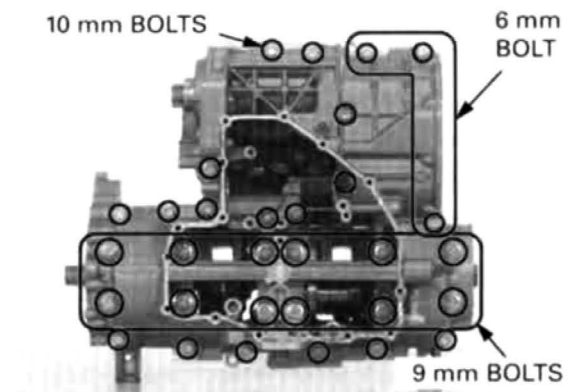
Refer to Service Information (page 12-3) for removal of necessary parts before separating the crankcase.

Loosen the 10 mm bolt and two 8 mm bolts in a crisscross pattern in 2 or 3 steps.
Remove the bolts and sealing washers.



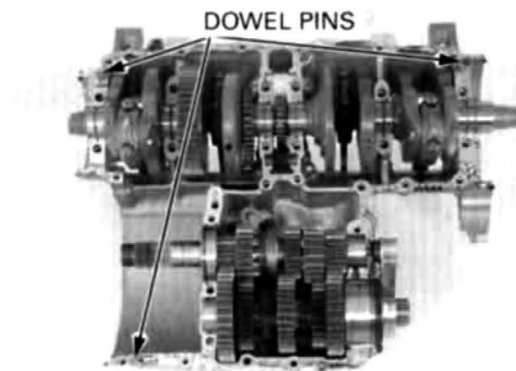
Place the engine with the upper side down.
Loosen the three 6 mm bolt and sixteen 8 mm bolts in a crisscross pattern in 2 or 3 steps.
Remove the bolts and sealing washers.
Loosen the twelve main journal 9 mm bolts in a crisscross pattern in 2 or 3 steps.
Remove the main journal bolts.

Separate the lower crankcase from the upper crankcase.



Remove the three dowel pins.

Clean any sealant off from the crankcase mating surface.



CRANKSHAFT/CONNECTING ROD

Separate the crankcase halves (page 12-5).

SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.30 mm (0.012 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of limit, replace the crankshaft.



Be careful not to damage the crankpin, main journal and bearing inserts

REMOVAL

Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Remove the connecting rod bearing cap nuts and bearing caps.

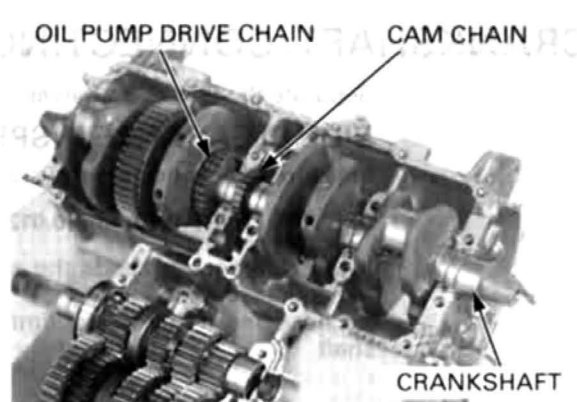
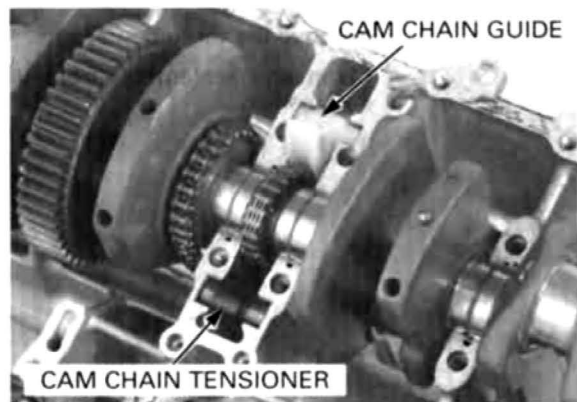
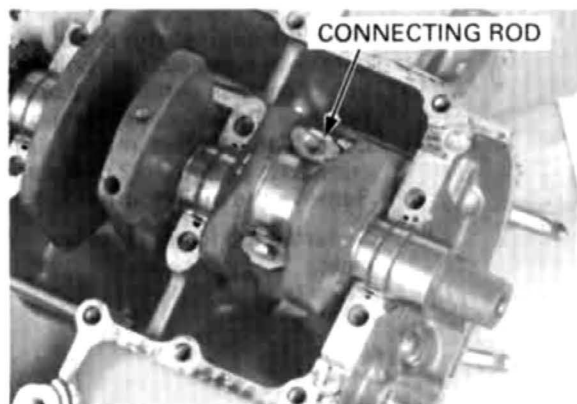
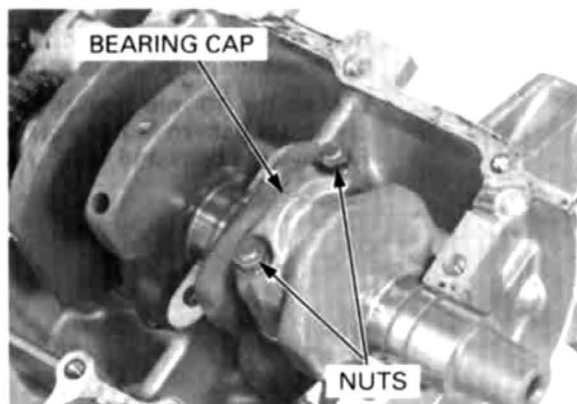
Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the connecting rod.

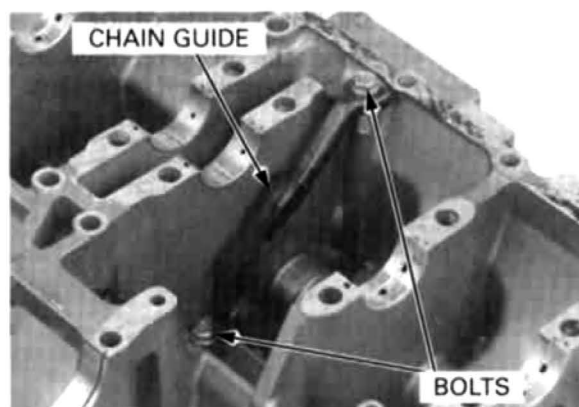
Remove the cam chain tensioner and cam chain guide.

Remove the crankshaft from the upper crankcase.

Remove the oil pump drive chain and cam chain from the crankshaft.



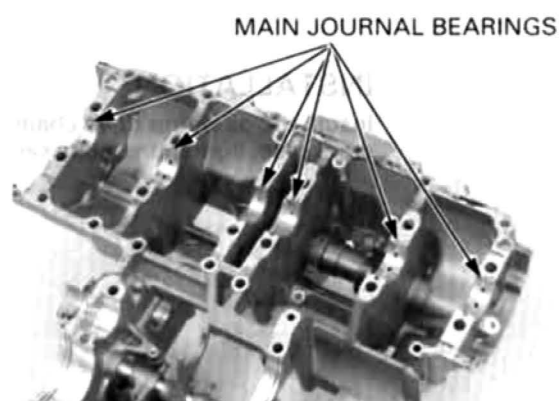
Remove the bolts and oil pump drive chain guide.



Remove the main journal bearings from the upper crankcase.



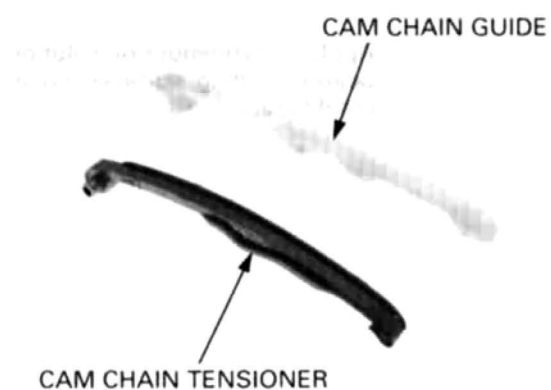
Remove the main journal bearings from the lower crankcase.



INSPECTION

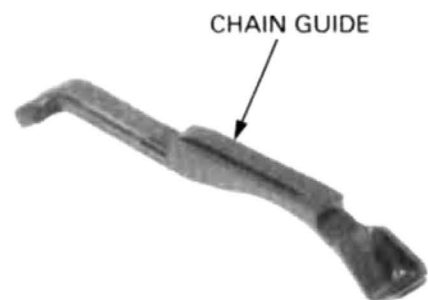
CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Check the cam chain tensioner and cam chain guide for wear or damage, replace if necessary.



OIL PUMP CHAIN GUIDE

Check the oil pump drive chain guide for wear or damage, replace if necessary.



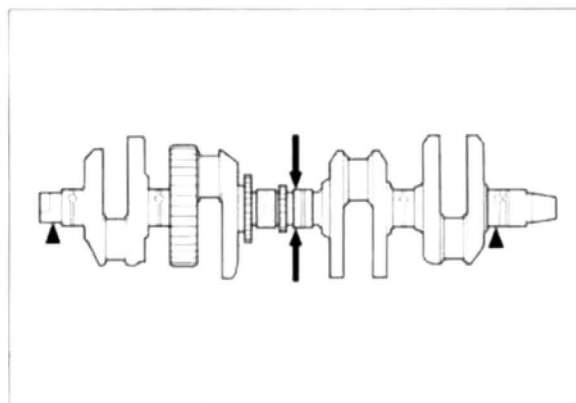
CRANKSHAFT

Set the crankshaft both end on V-blocks.

Set a dial gauge on the center main journal of the crankshaft.

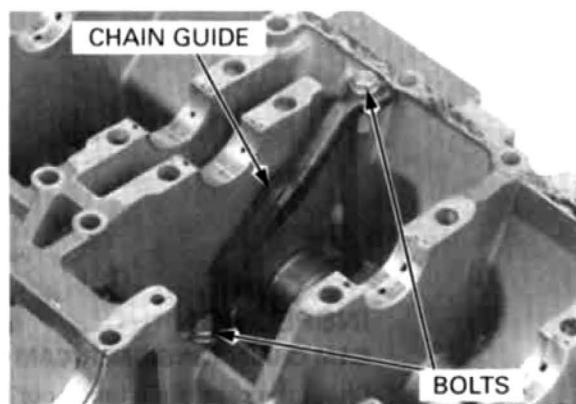
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.03 mm (0.001 in)

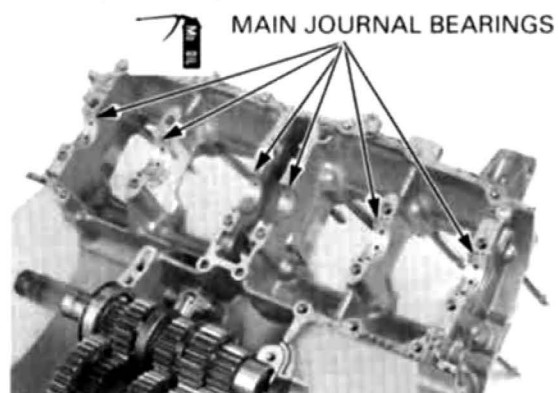


INSTALLATION

Install the oil pump drive chain guide into the lower crankcase, tighten the bolts securely.

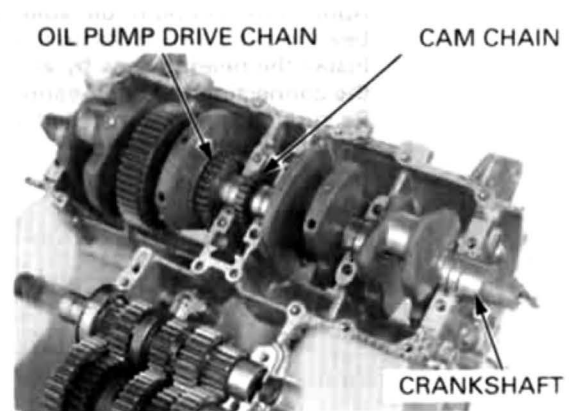


Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper and lower crankcase.

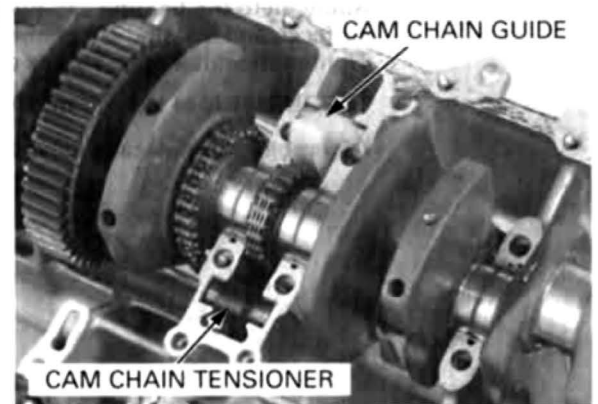


Install the oil pump drive chain and cam chain onto the crankshaft.

Install the crankshaft onto the upper crankcase.



Install the cam chain tensioner and cam chain guide into the upper crankcase grooves.

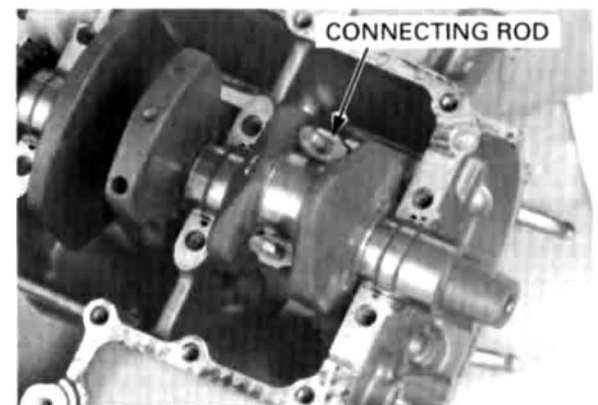


Do not get the molybdenum oil solution to the connecting rod bolts and bearing cap nuts. It may fail to tighten the cap nuts for correct torque values.

Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rods.

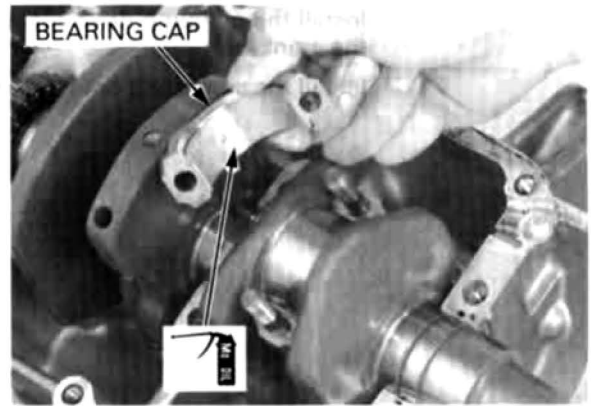


Insert the connecting rod from the cylinder side.



CRANKSHAFT/TRANSMISSION/BALANCER

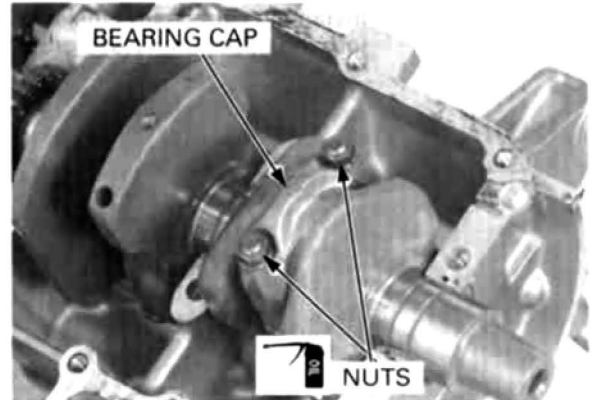
Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the bearing caps. Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap. Be sure each part is installed in its original position, as noted during removal.



Apply oil to the bearing cap nut threads and seating surfaces and install the cap nuts. Tighten the nut in 2 or 3 steps and torque them.

TORQUE: 41 N·m (4.2 kgf·m, 30 lbf·ft)

Assemble the crankcase halves (page 12-26).



MAIN JOURNAL BEARING

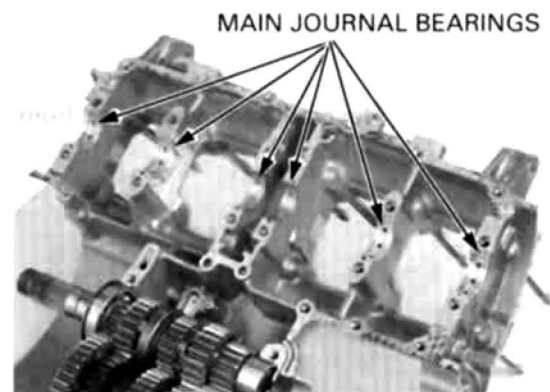
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 12-5).

BEARING INSPECTION

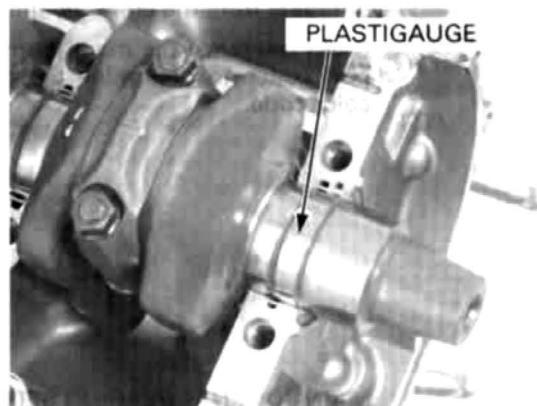
Inspect the main journal bearing inserts on the upper and lower crankcase for unusual wear or peeling. Check the bearing tabs for damage.



Do not rotate the crankshaft during inspection.

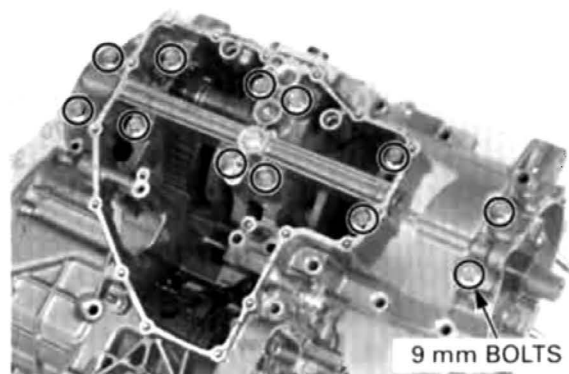
OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and main journals.
Install the crankshaft onto the upper crankcase.
Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.



Install the dowel pins.
Carefully install the lower crankcase on the upper crankcase.
Apply molybdenum disulfide oil to the main journal 9 mm bolts.
Install and tighten the main journal 9 mm bolts in a crisscross pattern in 2 or 3 steps.

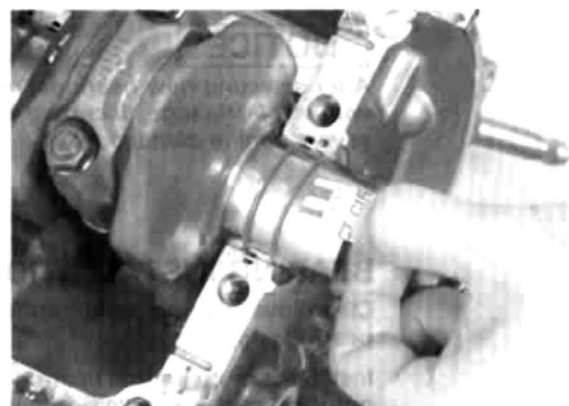
TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)



Remove the 9 mm bolts and lower crankcase.
Measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

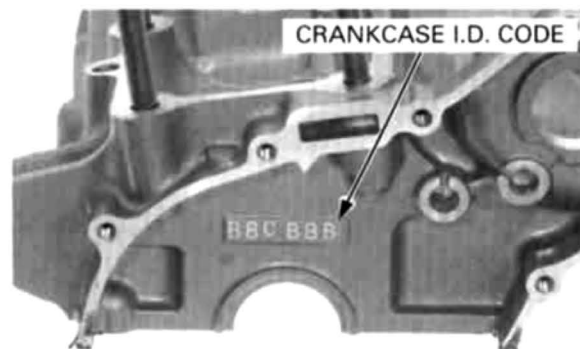
If main bearing clearance exceeds the service limit, select the correct replacement bearings.



Letters (A, B or C) on the left side of upper crankcase are the codes for the bearing support I.D.s from left to right.

BEARING SELECTION

Record the crankcase bearing support I.D. code letters from the pad on the left side of the upper crankcase as shown.



CRANKSHAFT/TRANSMISSION/BALANCER

Numbers (1 or 2) on the crank weight are the codes for the main journal O.D.s from left to right

Record the corresponding main journal O.D. code numbers from the crank weight.

Cross reference the main journal and bearing support codes to determine the replacement bearing color code.



MAIN JOURNAL O.D. CODE

MAIN JOURNAL BEARING SELECTION TABLE:

			BEARING SUPPORT I.D. CODE		
			A	B	C
			39.000 – 39.007 mm (1.5354 – 1.5357 in)	39.008 – 39.015 mm (1.5357 – 1.5360 in)	39.016 – 39.024 mm (1.5361 – 1.5364 in)
MAIN JOURNAL O.D. CODE	1	35.992 – 36.000 mm (1.4170 – 1.4173 in)	E (Pink)	D (Yellow)	C (Green)
	2	35.984 – 35.991 mm (1.4167 – 1.4170 in)	D (Yellow)	C (Green)	B (Brown)

BEARING THICKNESS:

B (Brown): Thick

C (Green):

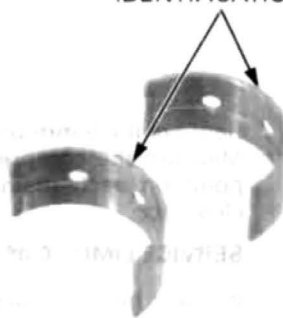
D (Yellow):

E (Pink): Thin

NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

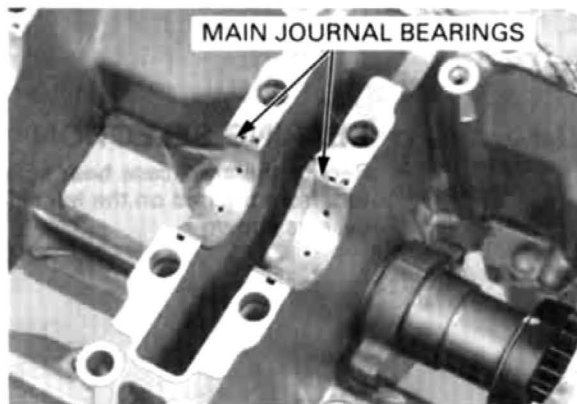
IDENTIFICATION COLOR



BEARING INSTALLATION

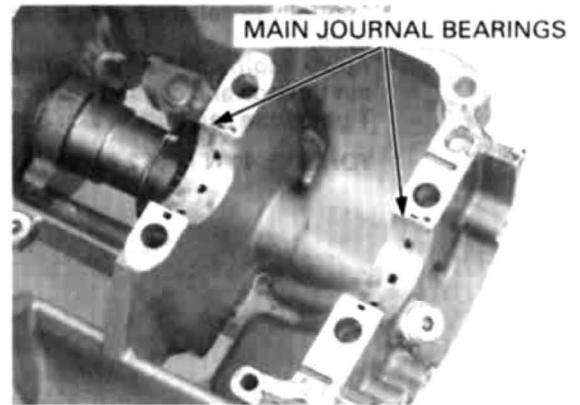
Clean the bearing outer surfaces and crankcase bearing supports.

Install the main journal bearing inserts (non-groove) onto the center crankcase bearing supports, aligning each tab with each groove.



MAIN JOURNAL BEARINGS

Install the main journal bearing inserts (with groove) onto the side crankcase bearing supports, aligning each tab with each groove.



CRANKPIN BEARING

NOTICE

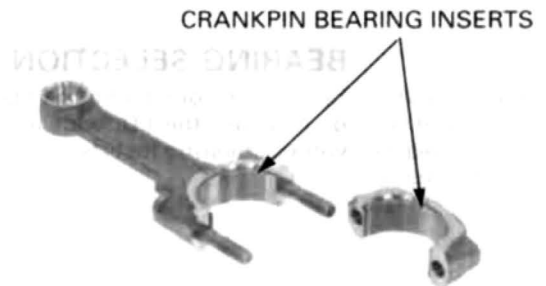
Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 12-5).

BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.

Check the bearing tabs for damage.



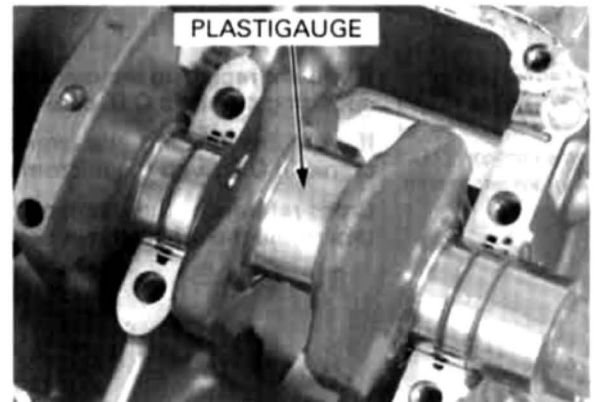
OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpin.

Carefully install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpin.

Put a strip of plastigauge lengthwise on the crankpin avoiding the oil hole.

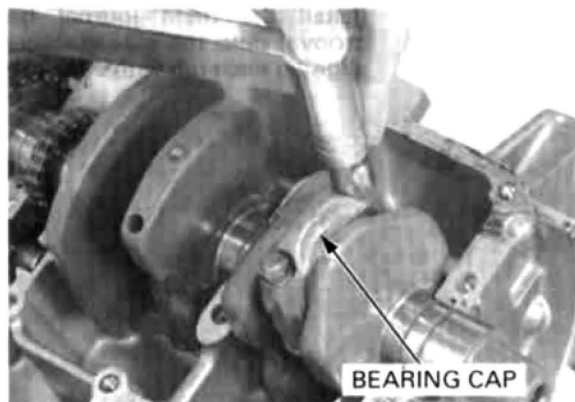


CRANKSHAFT/TRANSMISSION/BALANCER

Carefully install the bearing caps by aligning the I.D. code.

Apply engine oil to the connecting rod bearing cap nut threads and seating surfaces and install them. Tighten the cap nuts in 2 or 3 steps.

TORQUE: 41 N·m (4.2 kgf·m, 30 lbf·ft)



Remove the nuts and bearing cap. Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

Numbers (1 or 2) on the connecting rods are the codes for the connecting rod I.D.

Record the connecting rod I.D. code number (1 or 2) or measure the I.D. with the bearing cap installed without bearing inserts.



CONNECTING ROD I.D. CODE

Letters (A or B) on the crank weight are the codes for the crankpin O.D.s from left to right.

If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A or B).

If you are reusing the crankshaft, measure the crankpin O.D. with the micrometer.

Cross-reference the crankpin and rod codes to determine the replacement bearing color.



CRANKSHAFT O.D. CODE

CRANKPIN BEARING SELECTION TABLE:

			Connecting ROD I.D.CODE	
			1	2
			39.995 – 40.003 mm (1.5746 – 1.5749 in)	39.987 – 39.994mm (1.5743 – 1.5746 in)
CRANK PIN O.D.CODE	A	43.000 – 43.007 mm (1.6929 – 1.6932 in)	C (Yellow)	B (Green)
	B	43.008 – 43.016 mm (1.6932 – 1.6935 in)	B (Green)	A (Brown)

BEARING THICKNESS:

A (Brown): Thick
B (Green):
C (Yellow): Thin

NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

IDENTIFICATION COLOR



BEARING INSTALLATION

Clean the bearing outer surfaces, bearing cap and connecting rod.
Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.

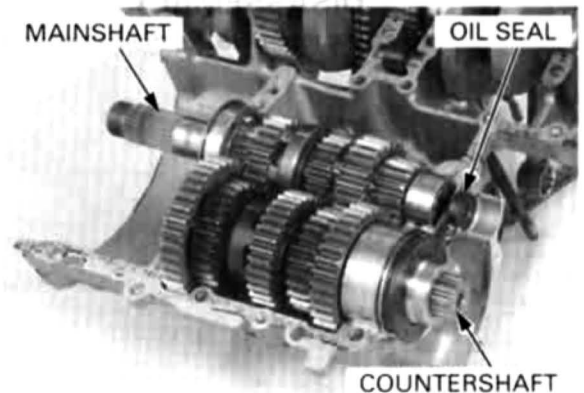
CRANKPIN BEARING INSERTS



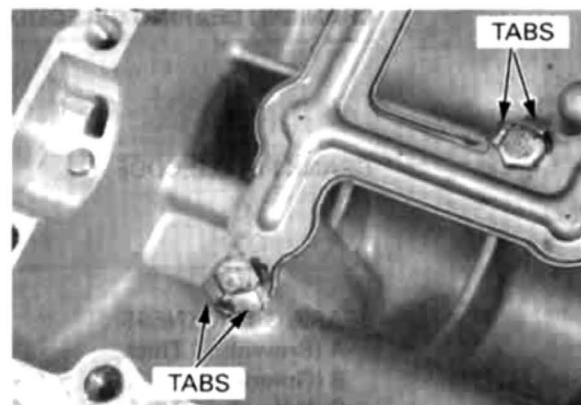
TRANSMISSION

REMOVAL

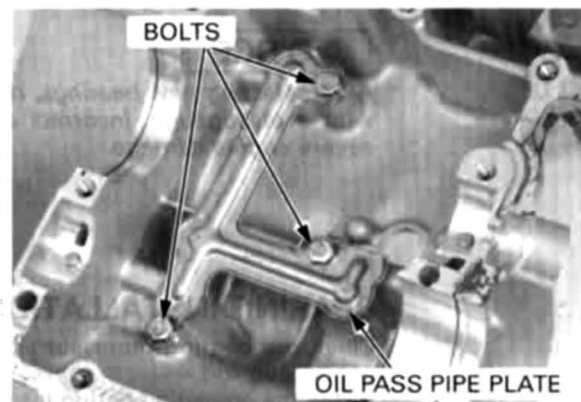
Separate the crankcase halves (page 12-5).
Remove the mainshaft oil seal.
Remove the mainshaft and countershaft assemblies.



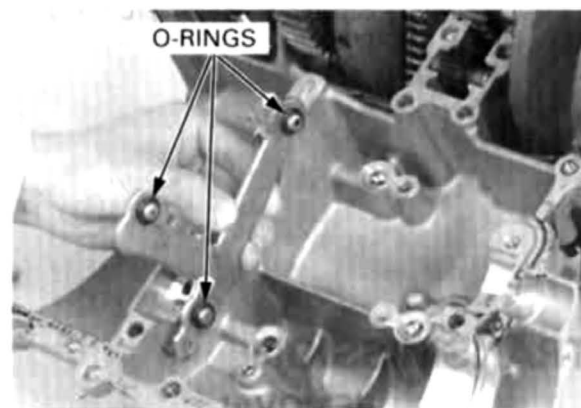
Bend the tabs of the oil pass pipe plate.



Remove the bolts and oil pass pipe plate

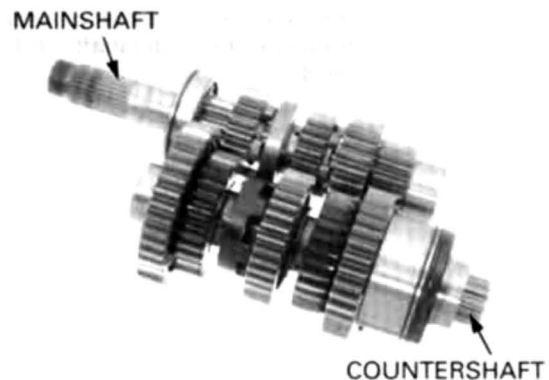


Remove the O-rings.



DISASSEMBLY

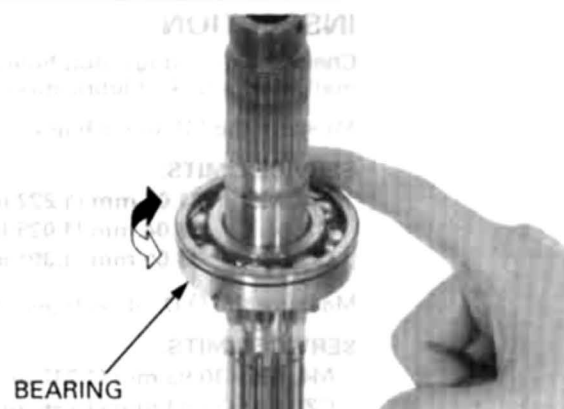
Disassemble the mainshaft and countershaft.



Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

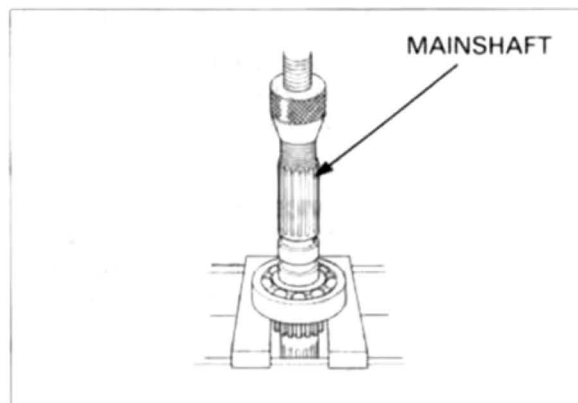
Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.

Replace the countershaft, collar and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.



MAINSHAFT BEARING REPLACEMENT

Press out the mainshaft from the bearing using a hydraulic press.



Install with the groove side facing up.

Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tools.

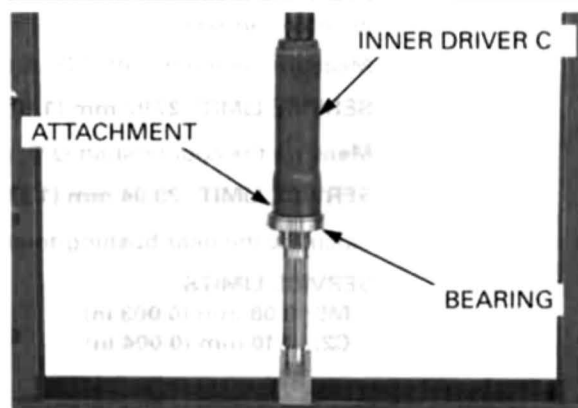
TOOLS:

Inner driver C

07746-0030100

Attachment, 30 mm I.D.

07746-0030300



INSPECTION

Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.

Measure the I.D. of each gear.

SERVICE LIMITS:

M4, M5: 31.05 mm (1.222 in)

C1: 26.04 mm (1.025 in)

C2, C3: 33.05 mm (1.301 in)

Measure the O.D. of each gear bushing.

SERVICE LIMITS:

M4, M5: 30.93 mm (1.218 in)

C2: 32.93 mm (1.296 in)

C3: 32.93 mm (1.296 in)

Measure the I.D. of each gear bushing.

SERVICE LIMITS:

M4: 28.04 mm (1.104 in)

C2: 30.02 mm (1.182 in)

Calculate the gear-to-bushing clearance.

SERVICE LIMITS:

M4, M5: 0.11 mm (0.004 in)

C2: 0.11 mm (0.004 in)

C3: 0.11 mm (0.004 in)

Check the gear shifter groove for abnormal wear or damage.

Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M4 gear.

SERVICE LIMIT: 27.97 mm (1.101 in)

Measure the countershaft O.D. at the C2 gear.

SERVICE LIMIT: 29.94 mm (1.179 in)

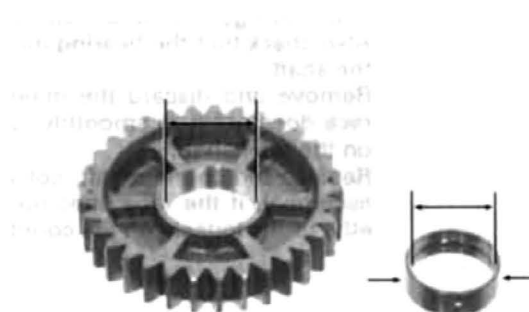
Calculate the gear bushing-to-shaft clearance.

SERVICE LIMITS:

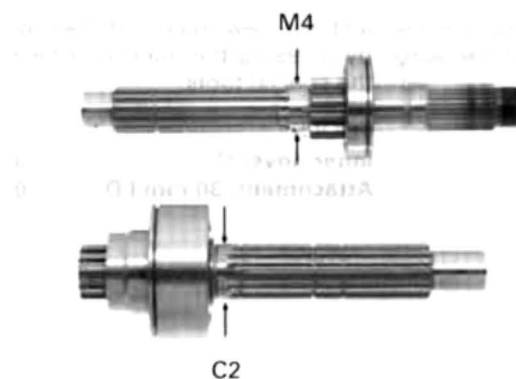
M5: 0.08 mm (0.003 in)

C2: 0.10 mm (0.004 in)

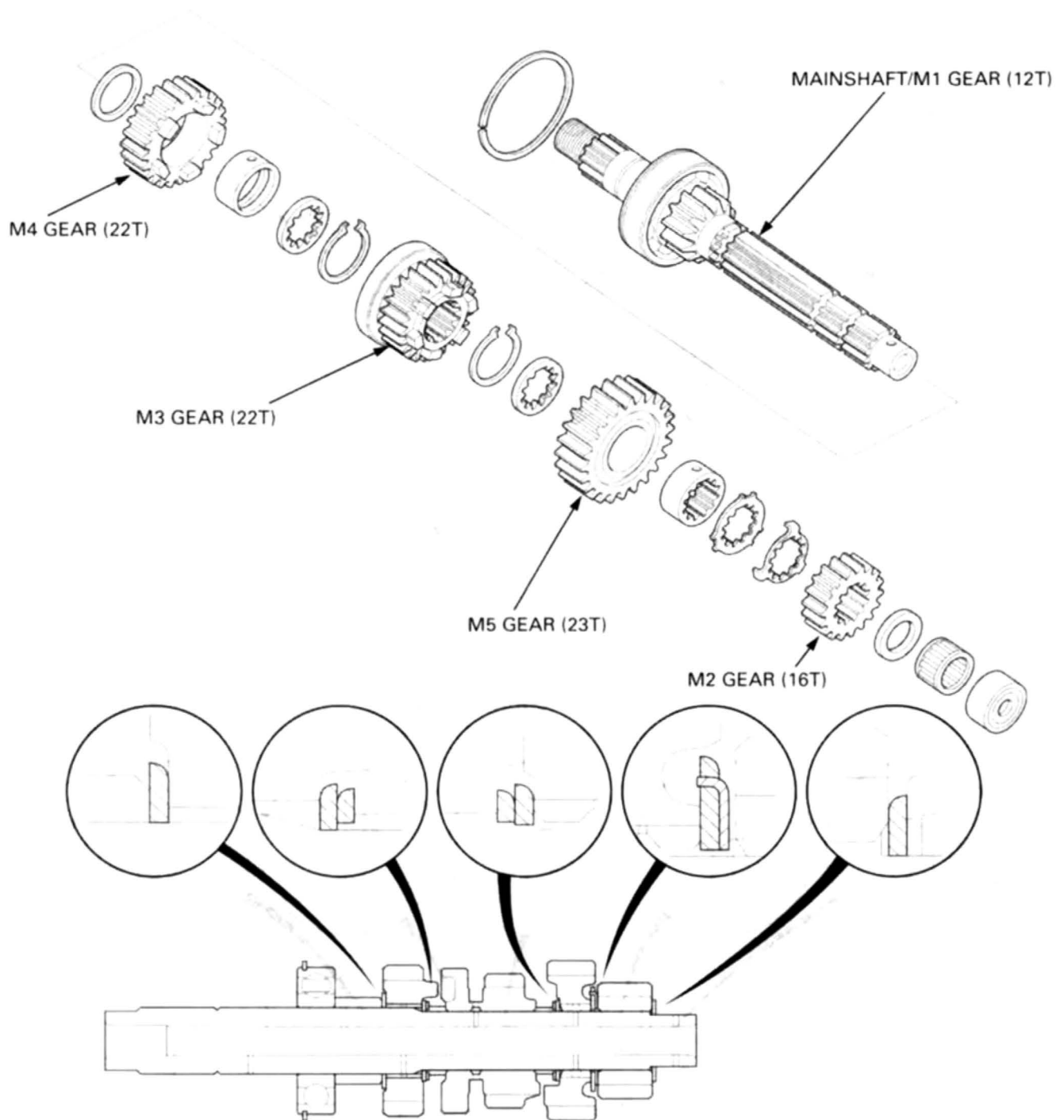
Check the needle bearing for wear or damage, replace if necessary.

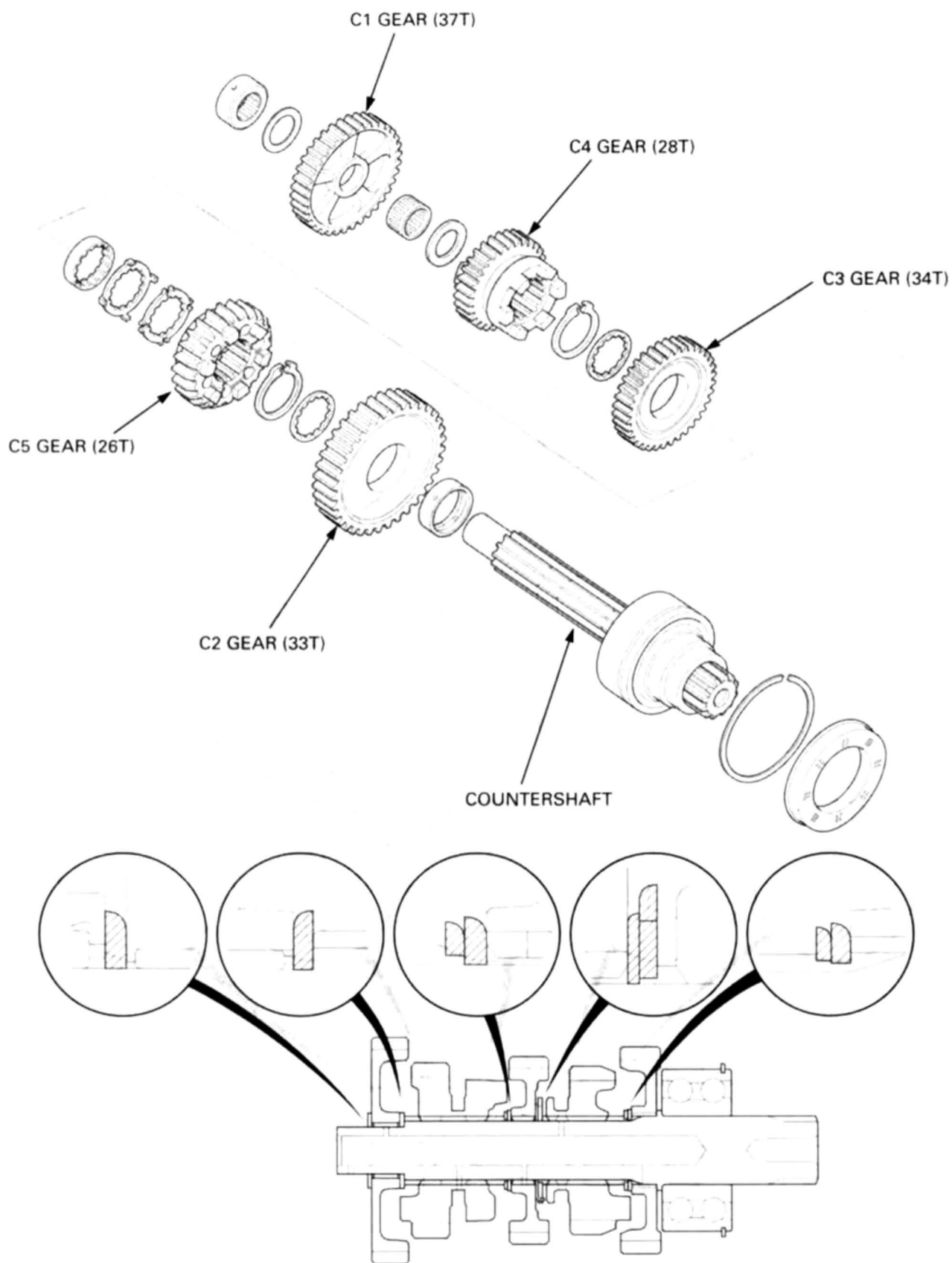


MAINSHAFT BEARING REPLACEMENT

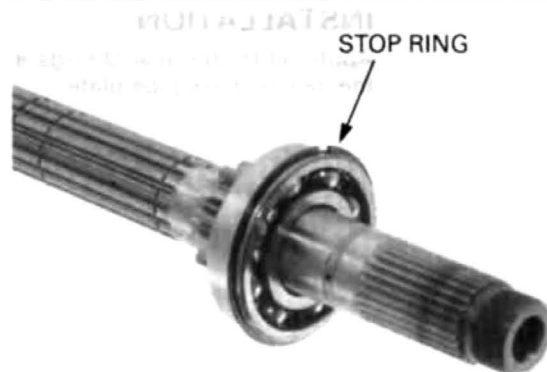


ASSEMBLY

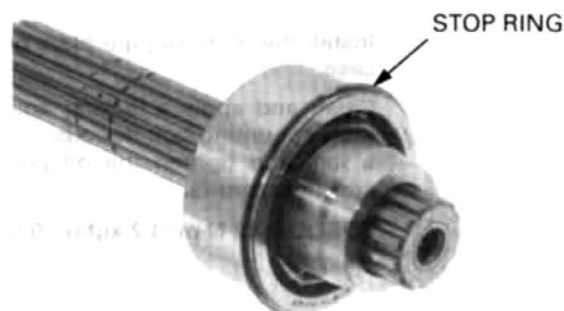




Install the stop ring into the groove of the mainshaft bearing.



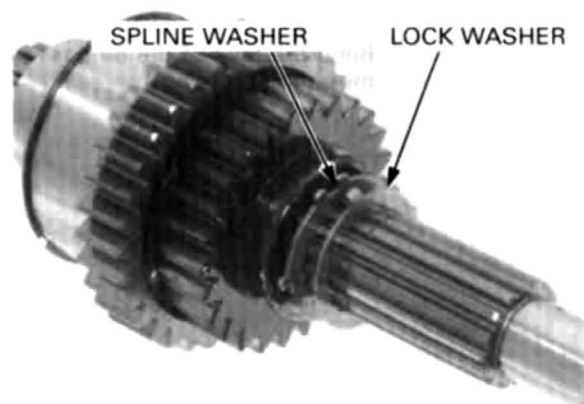
Install the stop ring into the groove of the countershaft bearing.



Coat each gear with clean engine oil and check for smooth movement.

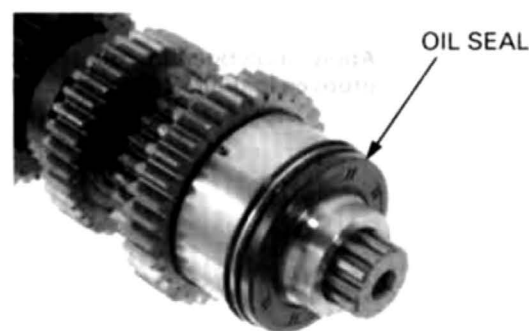
Assemble the transmission gear and shafts.

- Align the lock washer tabs with the spline washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



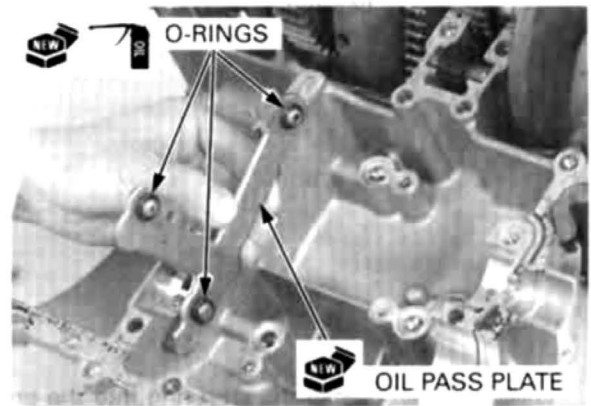
Check the countershaft oil seal for wear or damage, replace if necessary.

Install the countershaft oil seal.



INSTALLATION

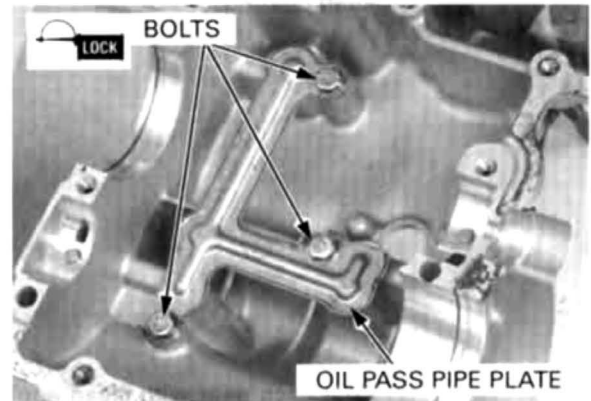
Apply oil to the new O-rings and install them onto the new oil pass pipe plate.



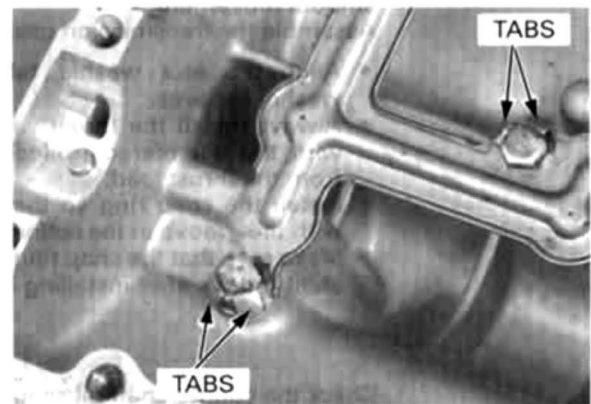
Install the oil pass pipe plate onto the upper crankcase.

Clean and apply a locking agent the oil pass pipe plate mounting bolt threads. Install and tighten the oil pass pipe plate to the specified torque.

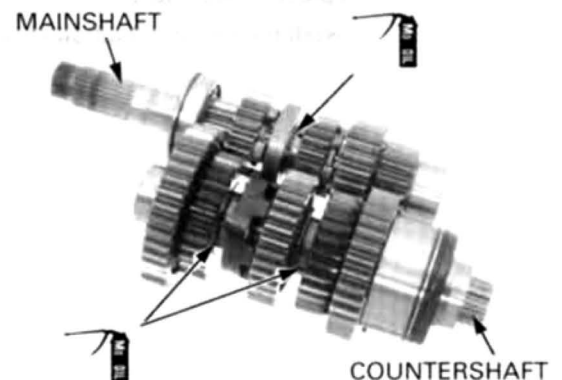
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Bend the tabs of the oil pass pipe plate against the mounting bolts.

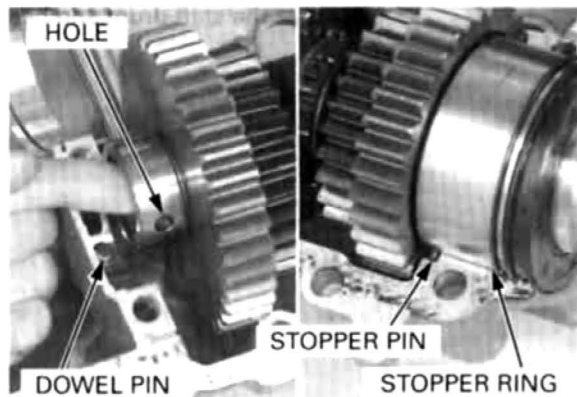


Apply molybdenum oil solution to the shift fork grooves in the M3, C4 and C5 gear.



Install the countershaft assembly onto the upper crankcase.

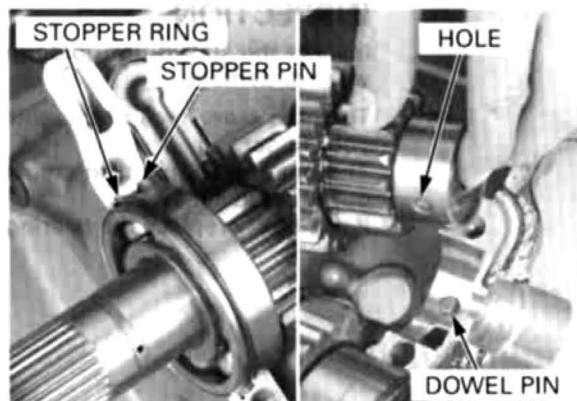
- Align the needle bearing case hole with the dowel pin on the upper crankcase.
- Align the stopper ring on the countershaft bearing with the groove of the upper crankcase.
- Install the stopper pin on the countershaft bearing with the groove of the upper crankcase.



Install the mainshaft assembly onto the upper crankcase.

- Align the needle bearing case hole with the dowel pin on the upper crankcase.
- Align the stopper ring on the mainshaft bearing with the groove of the upper crankcase.
- Install the stopper pin on the mainshaft bearing with the groove of the upper crankcase.

Assemble the crankcase (page 12-26).

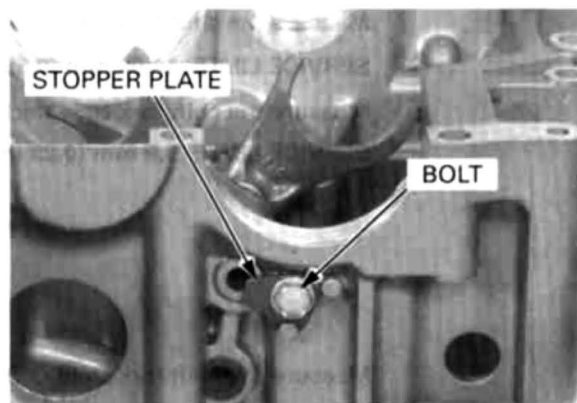


SHIFT FORK/SHIFT DRUM

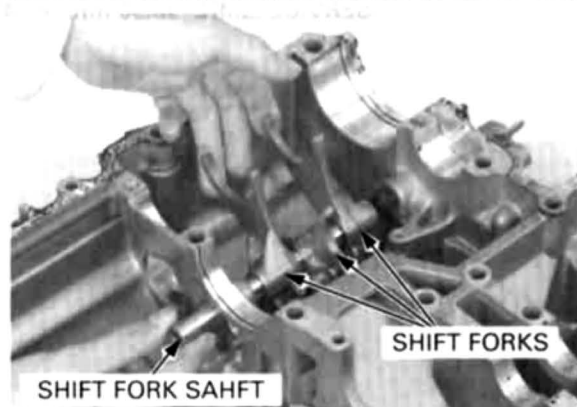
REMOVAL

Separate the crankcase halves (page 12-5).

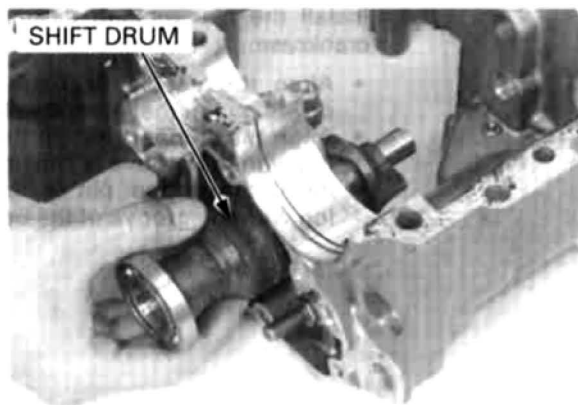
Remove the bolt and shift fork shaft stopper plate.



Remove the shift fork shaft and shift forks.



Remove the shift drum and bearing as an assembly.



INSPECTION

Inspect the shift drum guide grooves for abnormal wear or damage.

Turn the outer race of the shift drum bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

If necessary replace the bearing.



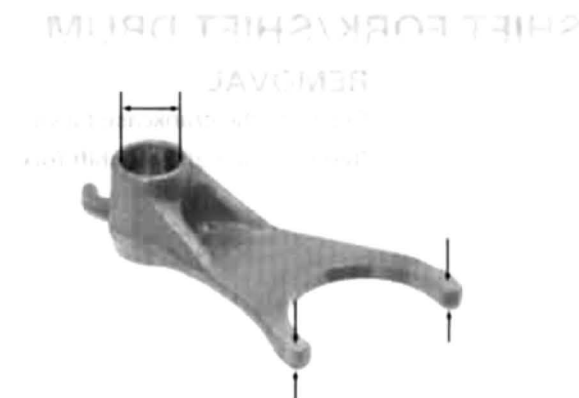
Check the shift fork guide pin for abnormal wear or damage.

Measure the shift fork I.D.

SERVICE LIMIT: 14.04 mm (0.553 in)

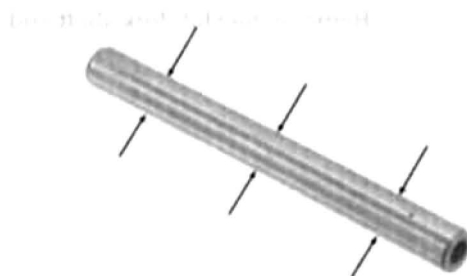
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)



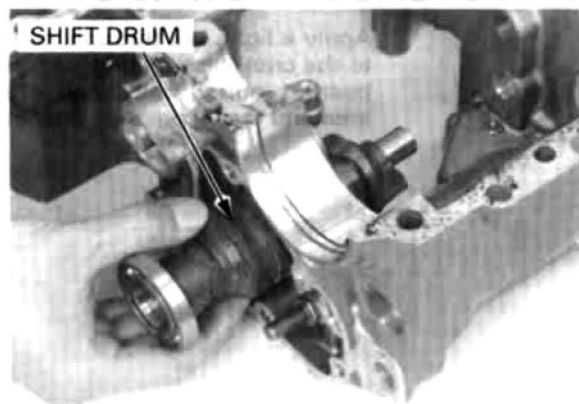
Measure the shift fork shaft O.D.

SERVICE LIMIT: 13.90 mm (0.547 in)



INSTALLATION

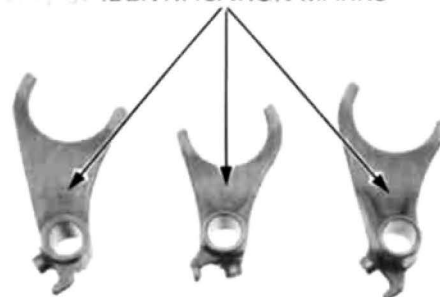
Install the shift drum/bearing assembly into the lower crankcase.



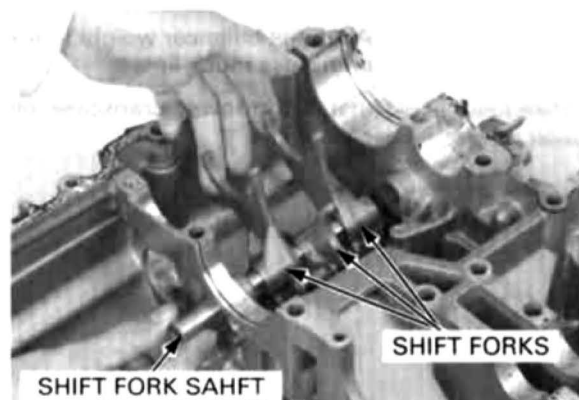
The shift forks have location marks:

- "R" for right
- "L" for left
- "C" for center

IDENTIFICATION MARKS



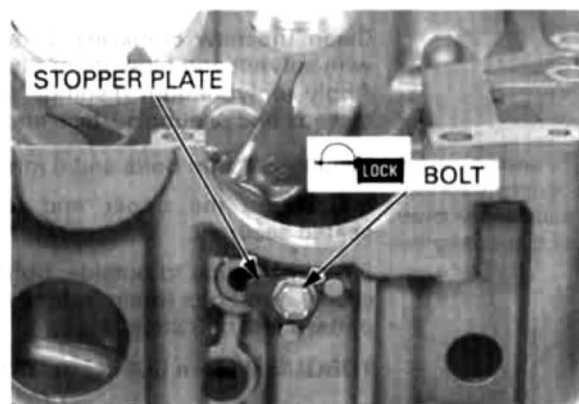
Install the shift forks into the shift drum guide groove with the identification marks facing toward the right side of the engine and insert the fork shaft.



Apply a locking agent to the threads of the shift fork shaft stopper plate bolt. Install the stopper plate, tighten the bolt to the specified torque.

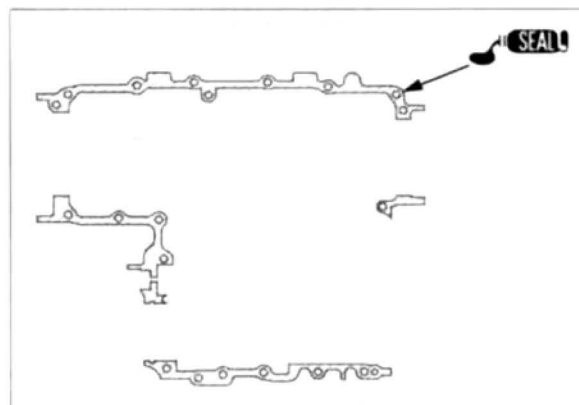
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Assemble the crankcase halves (page 12-22).

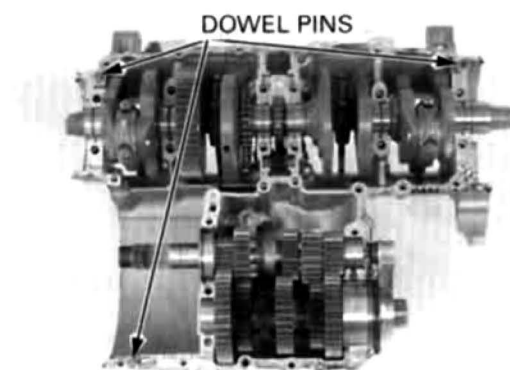


CRANKCASE ASSEMBLY

Apply a light, but thorough, coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 8 mm) area and the oil passage area as shown.



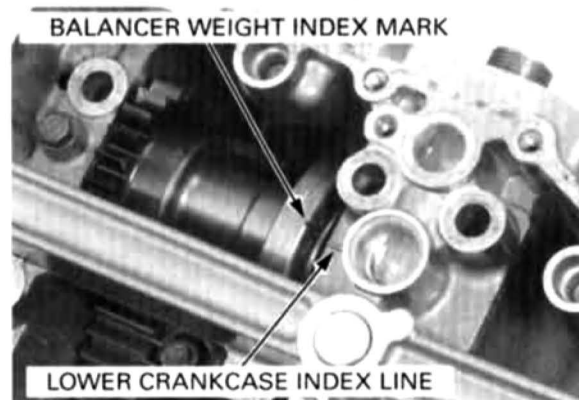
Install the three dowel pins.



Align the balancer weight index mark with the lower crankcase index line.

Make sure the balancer index mark is aligned on the lower crankcase index line.

Install the lower crankcase onto the upper crankcase.



Clean the new crankcase 9 mm bolts thoroughly with solvent and blow them dry.

Apply molybdenum disulfide oil to the 9 mm bolt threads and seating surface and install them.

The sealing washer locations are indicated on the lower crankcase using the "△" mark.

Install the 8 mm bolts and 6 mm bolts.

Make sure the upper and lower crankcase are seated securely.

From the inside to outside, tighten the lower crankcase 9 mm bolts (main journal bolts) in a crisscross pattern in 2 or 3 steps.

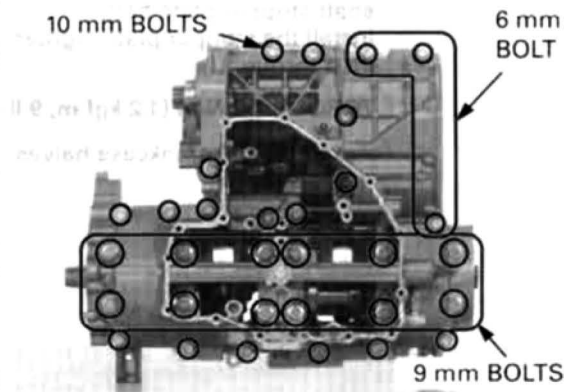
TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)

Tighten the 8 mm bolt to the specified torque, and then tighten 6 mm bolts.

TORQUE:

8 mm bolt: 25 N·m (2.5 kgf·m, 18 lbf·ft)

6 mm bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)



The sealing washer locations are indicated on the upper crankcase using the "△" mark.

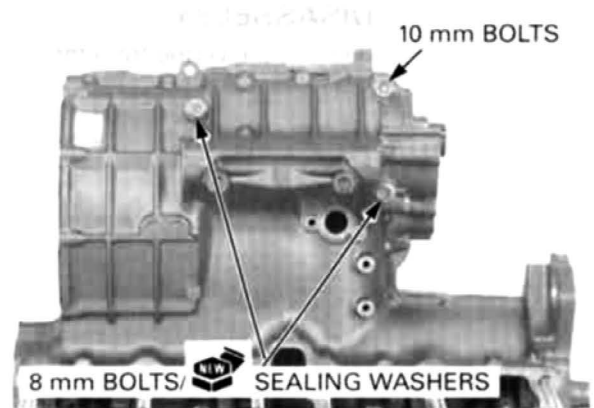
Install the upper crankcase 10 mm bolt and two 8 mm bolts with new sealing washers.

Tighten the 10 mm bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Tighten the 8 mm bolts alternately.

TORQUE: 24 N·m (2.5 kgf·m, 18 lbf·ft)



BALANCER

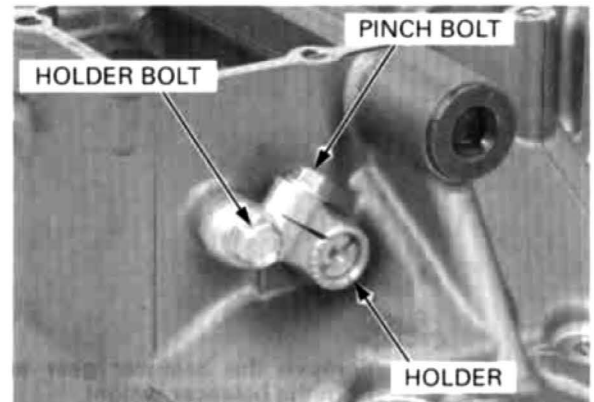
REMOVAL

Separate the crankcase halves (page 12-5).

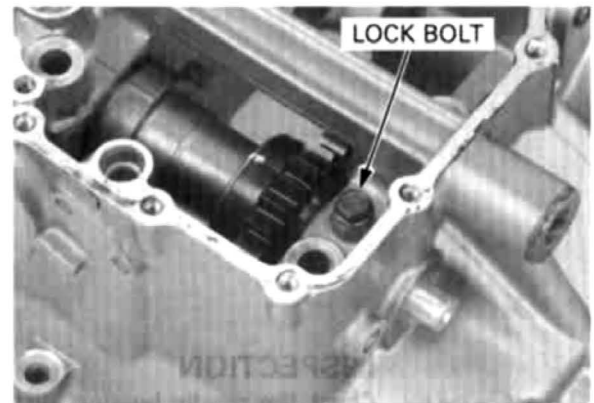
Remove the oil pump drive chain slider (page 12-7).

Loosen the balancer shaft pinch bolt.

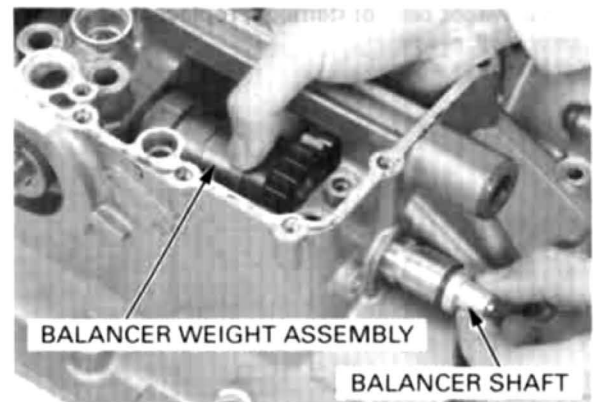
Remove the balancer shaft holder bolt and balancer holder.



Remove the balancer shaft lock bolt.



Remove the balancer shaft and balancer weight assembly.

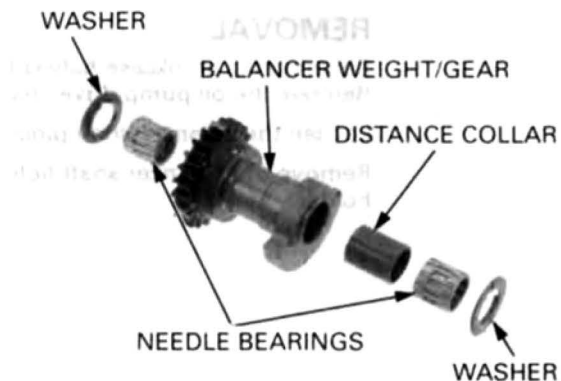


DISASSEMBLY

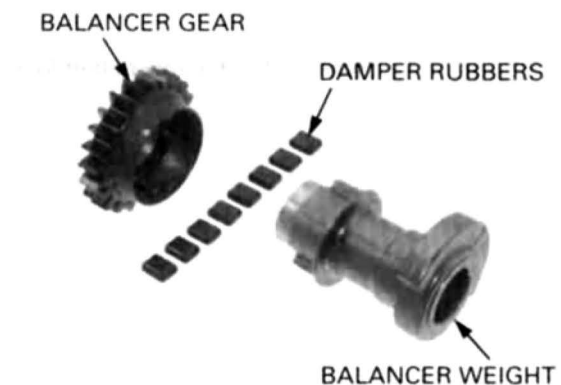
Remove the O-ring from the balancer shaft.



Remove the washers, needle bearings and distance collar from the balancer weight assembly.



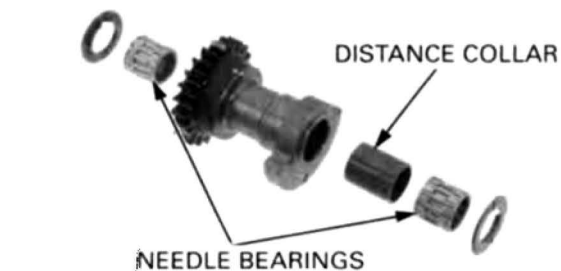
Remove the balancer gear and damper rubbers from the balancer weight.



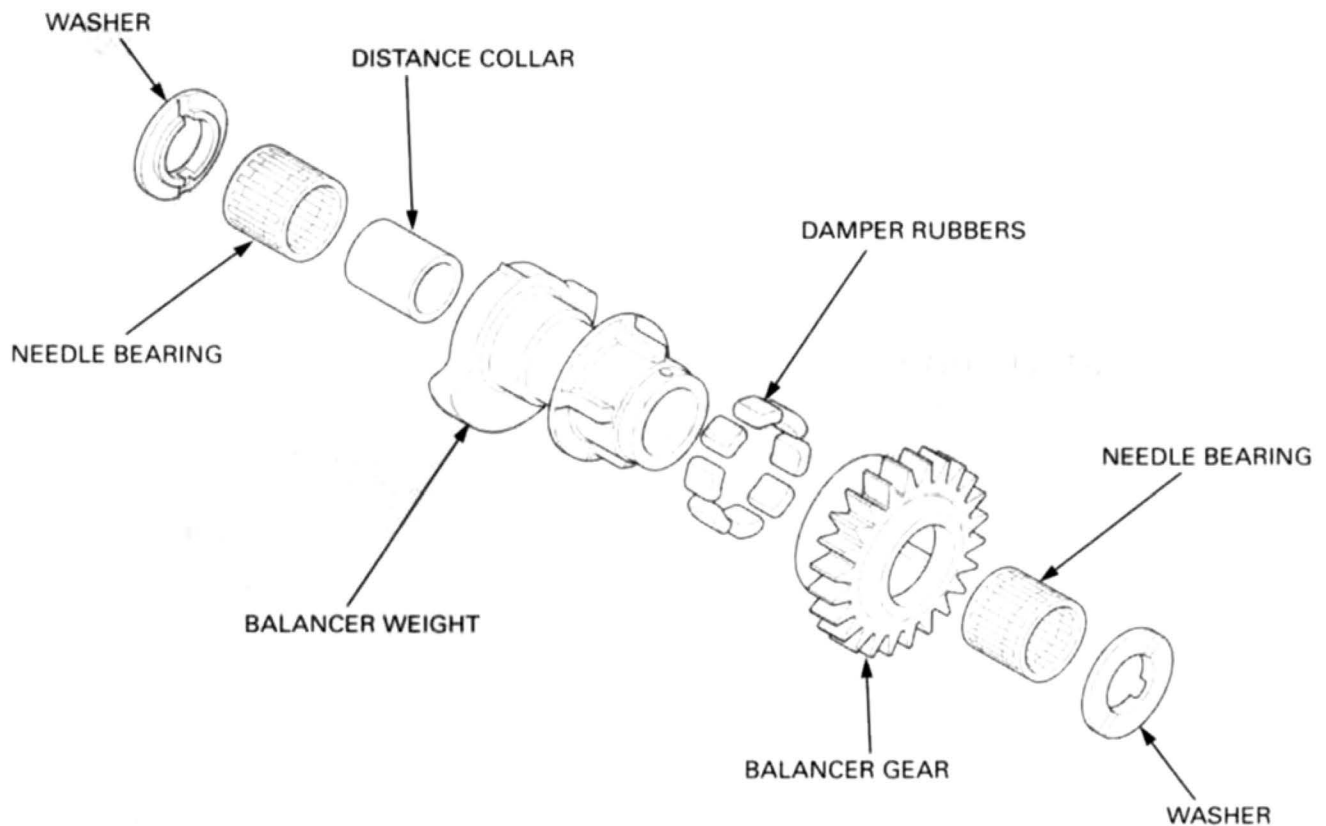
INSPECTION

Replace the balancer weight, balancer shaft, needle bearing as a set

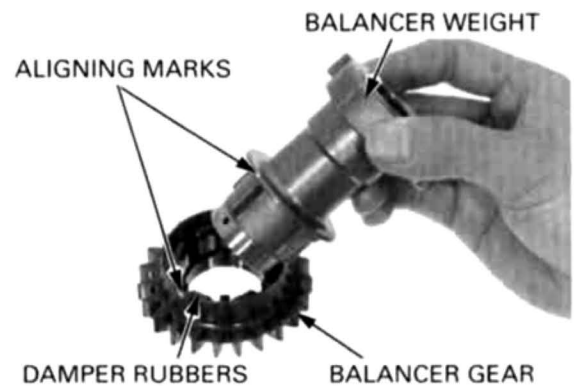
Check the needle bearing, distance collar for wear or damage, replace if necessary.



Check the balancer weight and gear for wear or damage.
Check the damper rubbers for fatigue or damage, replace if necessary.

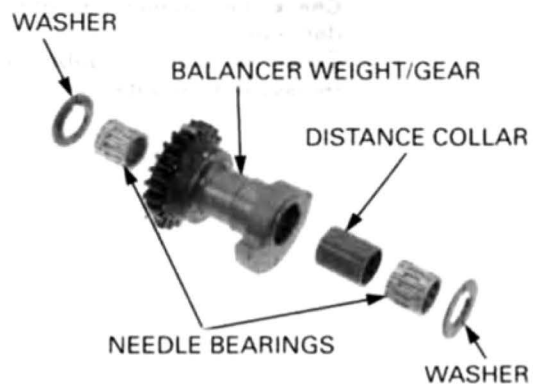
BALANCER GEAR**DAMPER RUBBERS****BALANCER WEIGHT****DISASSEMBLY**

Install the damper rubbers into the balancer gear.
Assemble the balancer gear and weight while aligning the aligning marks.

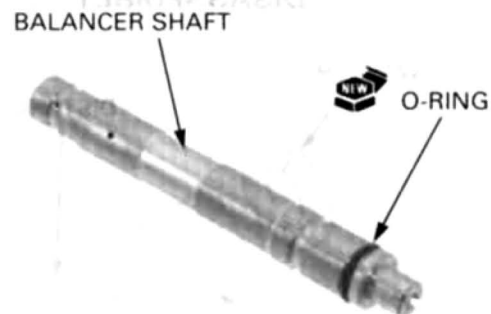


CRANKSHAFT/TRANSMISSION/BALANCER

Install the distance collar.
Apply oil to the needle bearing, install them into the balancer weight.
Install the washers.



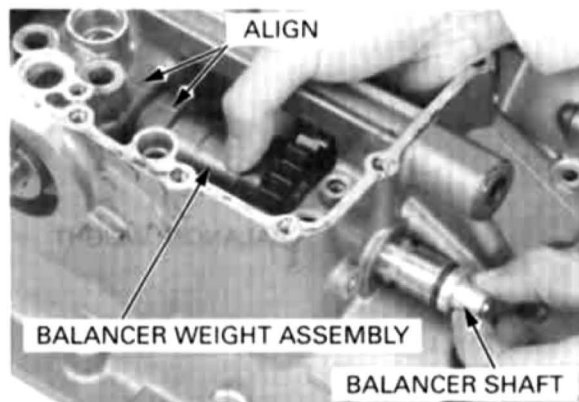
Install a new O-ring to the balancer shaft.



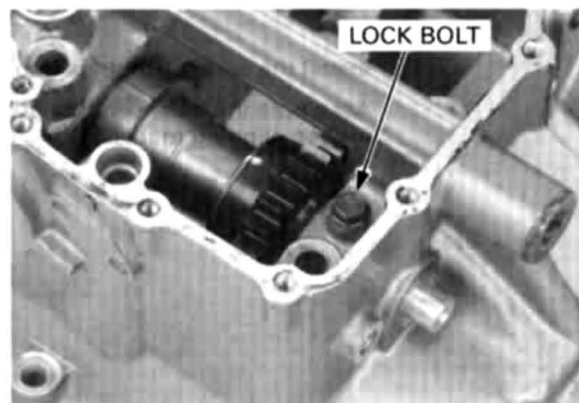
INSTALLATION

Install the balancer weight into the lower crankcase.
Align the index line of the balancer weight with the index line on the lower crankcase.

Install the balancer shaft.



Install the balancer shaft lock bolt.



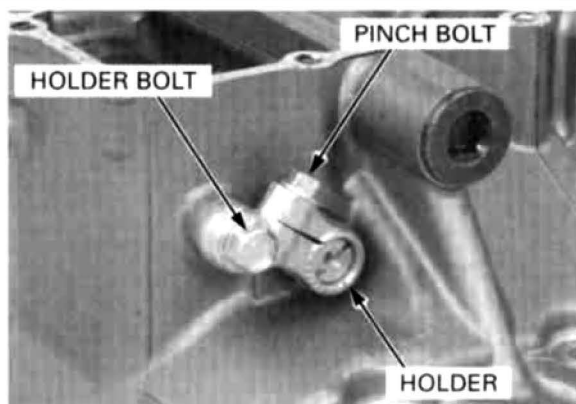
Install the balancer shaft holder.

Install the balancer holder bolt and balancer holder pinch bolt.

Tighten the balancer holder bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the oil pump drive chain slider (page 12-7).

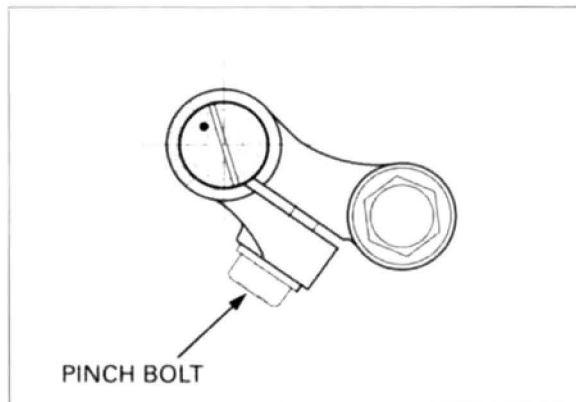


BACKLASH ADJUSTMENT

Install the engine into the frame (page 8-8).

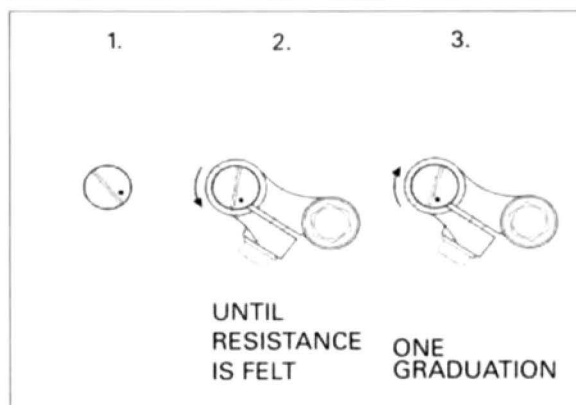
Loosen the balancer shaft holder pinch bolts.

Adjust the backlash while the engine is cold (below 35°C/ 95°F) and the engine is not running.



Excessive force can cause balancer gear, bearing and shaft damage. Do not turn the shaft more than necessary.

Turn the balancer shaft counterclockwise until resistance is felt, then back it off one graduation using the punch mark as a measure.



Warm up the engine and let it idle.

If the balancer gear noises are excessive, adjust the balancer backlash as follows:

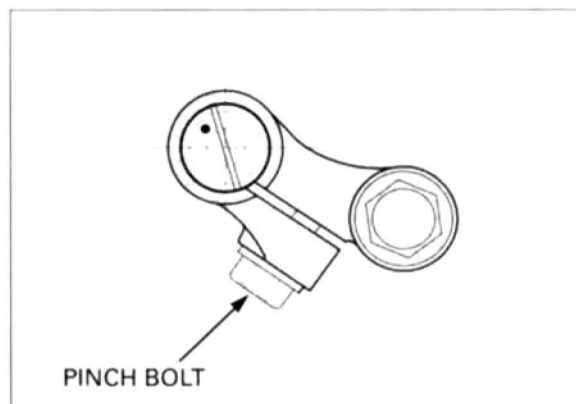
Turn the balancer gear shaft counterclockwise until the gears begin to make a "whining" noise. Then turn the gear shaft clockwise until the gear "whining" noise disappears.

Tighten the balancer shaft pinch bolt.

After all gear backlash adjustments are done, snap the throttle and make sure the gear noises are not excessive.

If the gear "whine" noise is excessive, the backlash is too small.

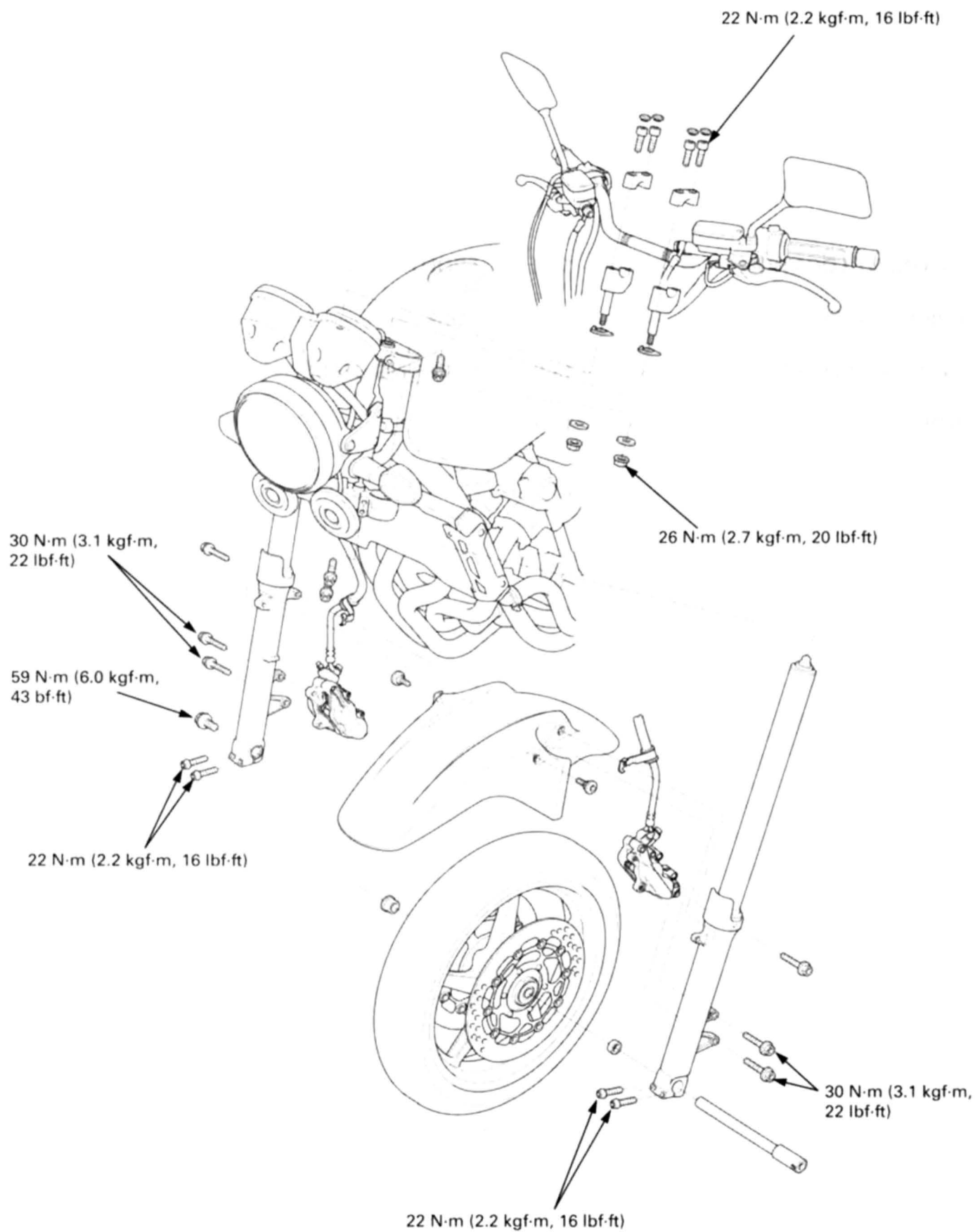
If the gear "rattling" noise is excessive, the backlash is excessive.



13. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION	13-2	FRONT WHEEL	13-12
SERVICE INFORMATION	13-3	FORK	13-18
TROUBLESHOOTING	13-5	STEERING STEM	13-30
HANDLEBAR	13-6		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Refer to the brake system information (page 15-4).
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".

SPECIFICATIONS



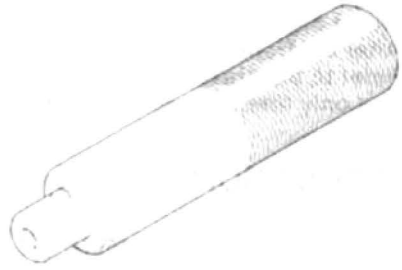



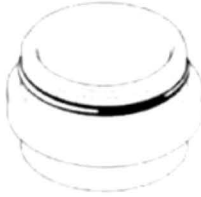





ITEM		STANDARD	Unit: mm (in)
			SERVICE LIMIT
Minimum tire tread depth		-	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	-
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	-
Axle runout		-	0.2 (0.01)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel balance weight		-	60 g (2.1oz) max.
Fork	Spring free length	348.7 (13.73)	341.7 (13.45)
	Tube runout	-	0.20 (0.008)
	Recommended fork fluid	Honda Ultra Cushion Oil 10W or equivalent	-
	Fluid level	160 (6.3)	-
	Fluid capacity	500 ± 2.5 cm ³ (16.9 ± 0.08 US oz, 17.6 ± 0.09 Imp oz)	-
	Pre-load adjuster initial setting	14 mm (0.6 in) from top/4th groove	-
		Rebound adjuster initial setting	1 - 1/2 turn out from full hard
Steering head bearing pre-load		1.0 - 1.5 kgf (2.2 - 3.3 lbf)	-

TOEQUE VALUES

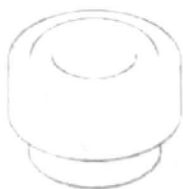
Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw; replace with a new one
Handlebar upper holder socket bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Handlebar lower holder nut	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Front brake master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder flange bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt; replace with a new one
Fork bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Fork top bridge pinch socket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork bottom bridge pinch flange bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Steering bearing adjusting nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply oil to the threads and seating surface
Steering bearing adjusting nut lock nut	-	See page 13-30
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	See page 13-30
		See page 13-30

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

<p>Bearing remover shaft 07GGD-0010100</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Driver 07749-0010000</p> 
<p>Attachment, 42 X 47 mm 07746-0010300</p> 	<p>Pilot, 20 mm 07746-0040500</p> 	<p>Slider weight 07947-KA50100</p> 
<p>Seal driver attachment 07947-KA40200</p> 	<p>Steering stem socket 07916-3710101</p> 	<p>Driver attachment 07953-MJ10100</p> 
<p>Driver handle 07953-MJ10200</p> 	<p>Bearing race remover 07946-3710500</p> 	<p>Attachment, 52 X 55 mm 07746-0010400</p> 

Attachment, 30 mm
07746-0030300



TROUBLESHOOTING

Hard steering

- Steering head bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

Steers to one side or does not track straight

- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Bent axle
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced front tire and wheel

Front heel turns hard

- Faulty front wheel bearing
- Bent front axle
- Front brake drag

Soft suspension

- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

Hard suspension

- Bent fork pipes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

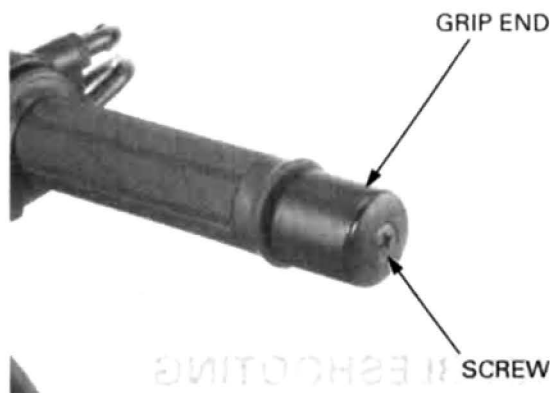
Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners

HANDLEBAR

REMOVAL

Hold the handlebar weight and remove the mounting screw and the weight.

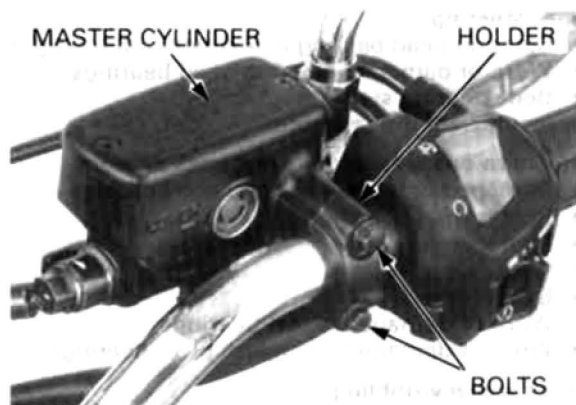


Remove the right rearview mirror.

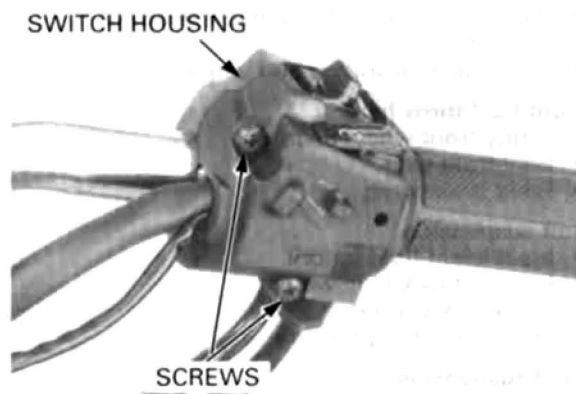
Disconnect the front brake switch wire connectors from the switch.

Keep the brake master cylinder upright to prevent air from entering the hydraulic system

Remove the master cylinder holder bolts, holder and master cylinder assembly.



Remove the right handlebar switch/throttle housing screws.

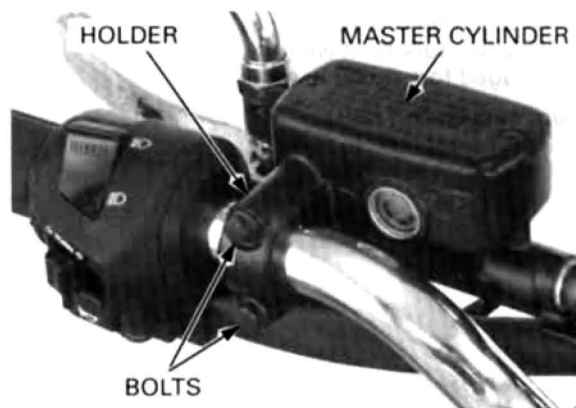


Remove the left rearview mirror.

Disconnect the clutch switch wire connectors from the switch.

Keep the clutch master cylinder upright to prevent air from entering the hydraulic system

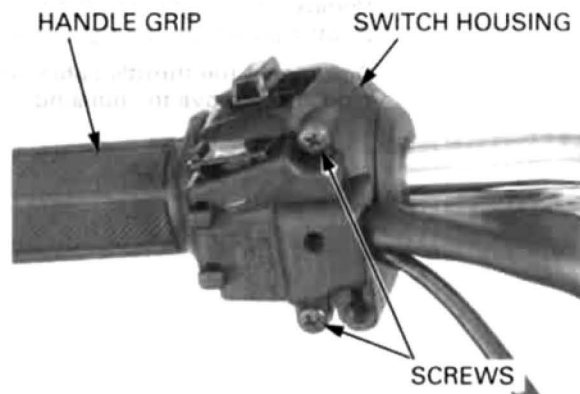
Remove the master cylinder holder bolts, holder and master cylinder assembly.



Remove the screws and left handlebar switch housing.

Remove the handle grip from the handlebar.

Remove the left handlebar switch end cover.

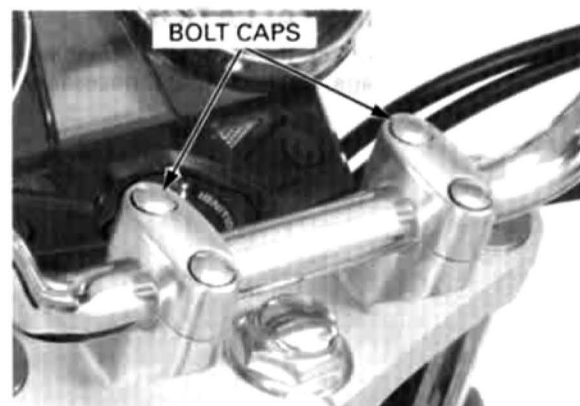


Do not remove the lower holder nuts.

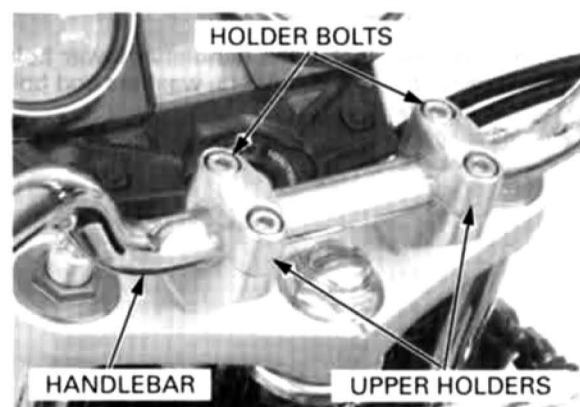
If you will be remove the handlebar lower holder, loosen the lower holder nuts before removing the upper holder bolts.



Remove the handlebar upper holder bolt caps.



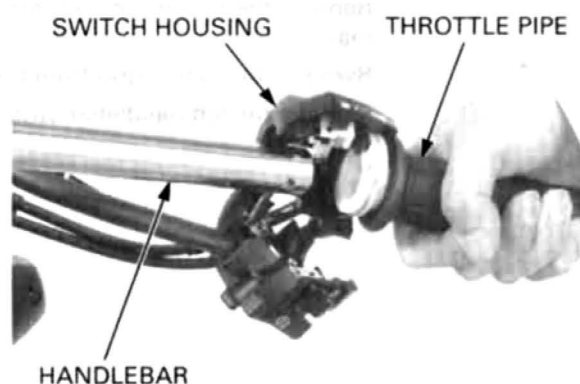
Remove the handlebar upper holder bolts, upper holders and handlebar.



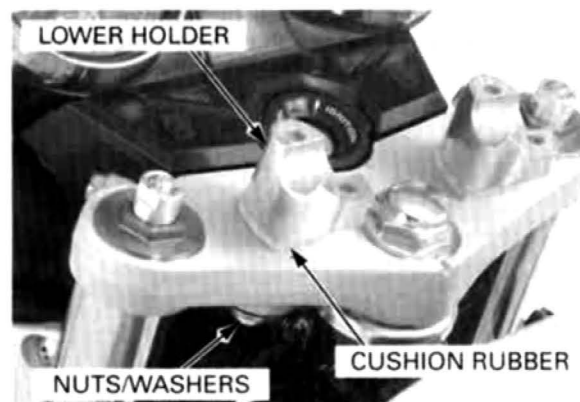
FRONT WHEEL/SUSPENSION/STEERING

Remove the right handlebar switch housing and throttle pipe from the right handlebar.

Disconnect the throttle cable ends from the throttle pipe and remove the housing.

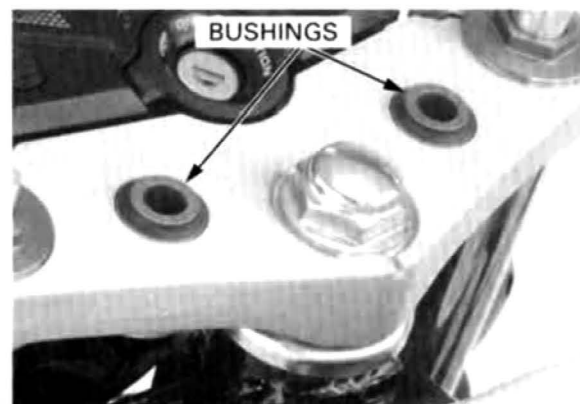


Remove the lower holder nuts and washers, then remove the handlebar lower holders and cushion rubbers.



INSTALLATION

Check the handlebar bushings for fatigue or damage, replace them if necessary.

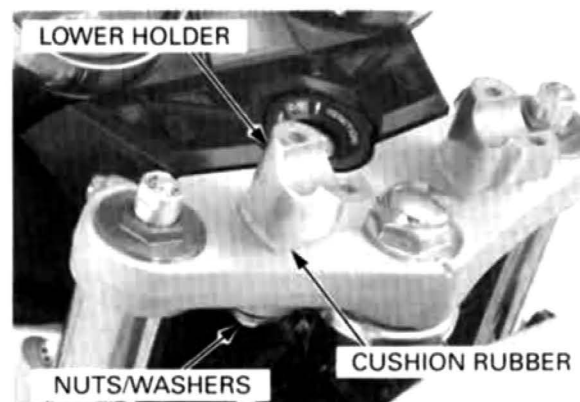


Do not tighten the lower holder nuts.

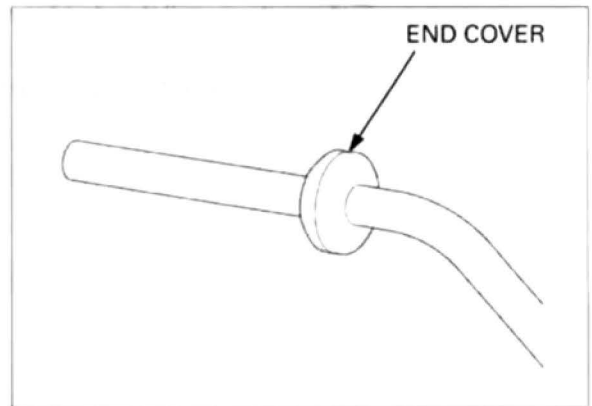
Tighten the nuts after installing the upper holders.

Install the handlebar lower holder cushion rubbers, lower holders, washers and holder nuts.

If you wish the handlebar position forward, turn the lower holders 180 degrees.

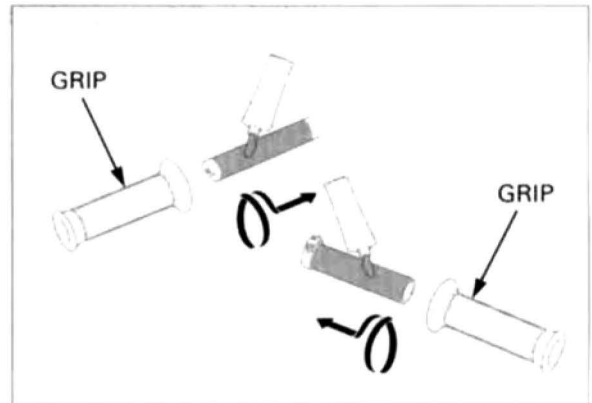


Install the left handlebar switch end cover onto the handlebar.



Apply Honda Bond A or equivalent adhesive to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

Wait 3 – 5 minutes and install the grip.



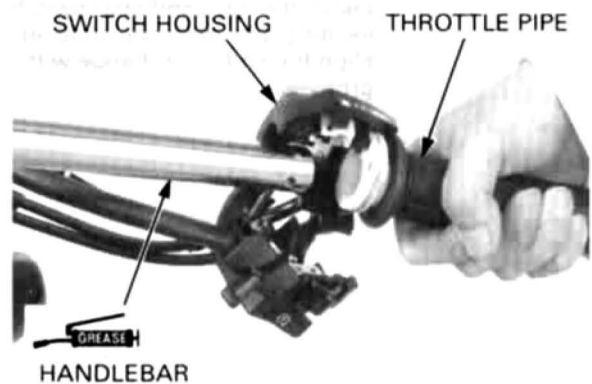
Allow the adhesive to dry for an hour before using.

Rotate the grip for even application of the adhesive.

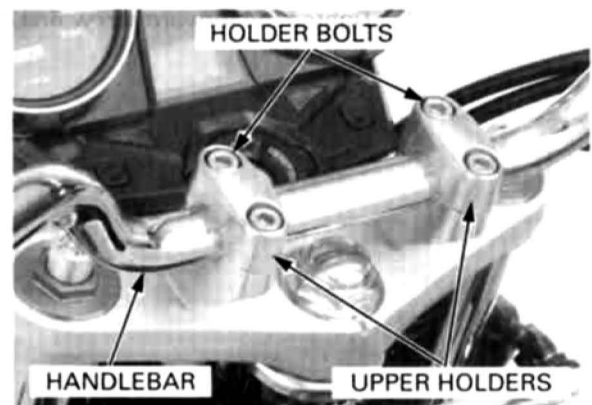
Connect the throttle cable ends to the throttle pipe.

Apply grease to the sliding surface of the throttle pipe.

Install the throttle pipe into the handlebar.



Install the handlebar onto the lower holder.



Align the punch marks on the handlebar with the mating surface of the upper and lower holders.

Install the handlebar upper holders with their punch mark facing forward, then install the holder bolts.

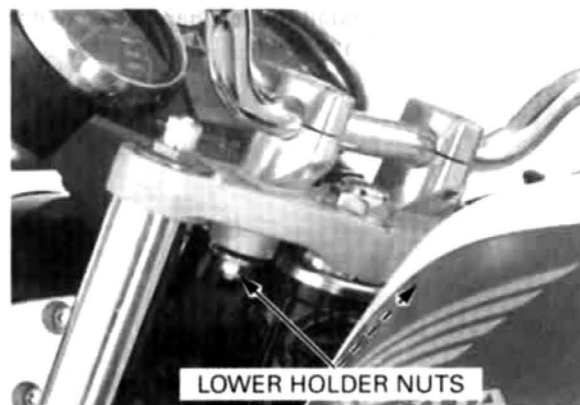
Tighten the forward bolt first, then tighten the rear bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

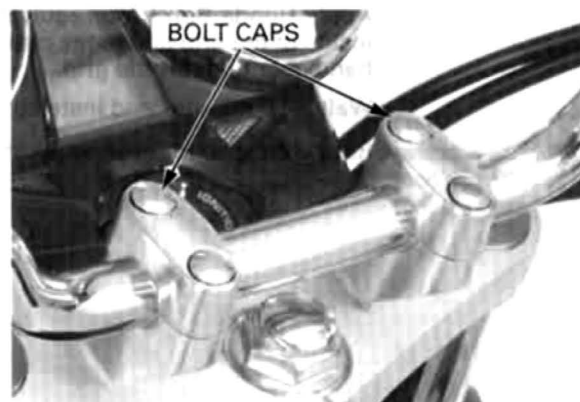
FRONT WHEEL/SUSPENSION/STEERING

Tighten the handlebar holder nuts to the specified torque.

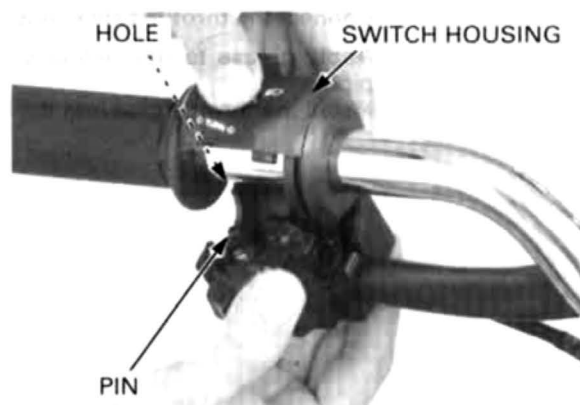
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



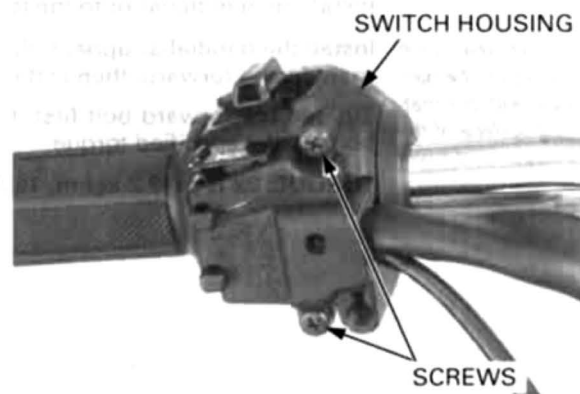
Install the handlebar upper holder bolt caps.



Install the left handlebar switch housing aligning its locating pin with the hole in the handlebar, also align the end cover flange with the handlebar switch grooves.



Tighten the forward screw first, then the rear screw.



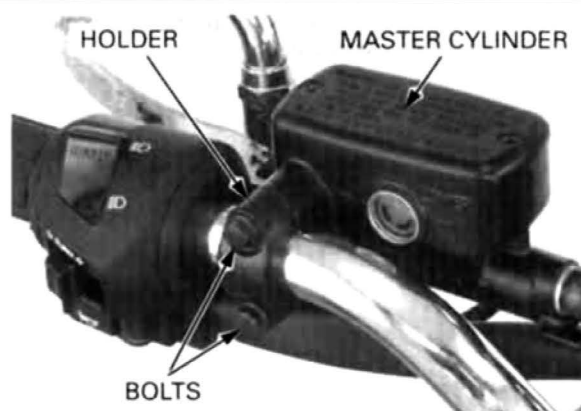
Install the clutch master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

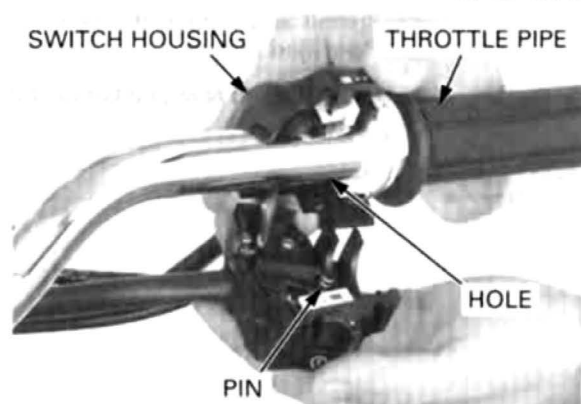
Tighten the upper bolt first, the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

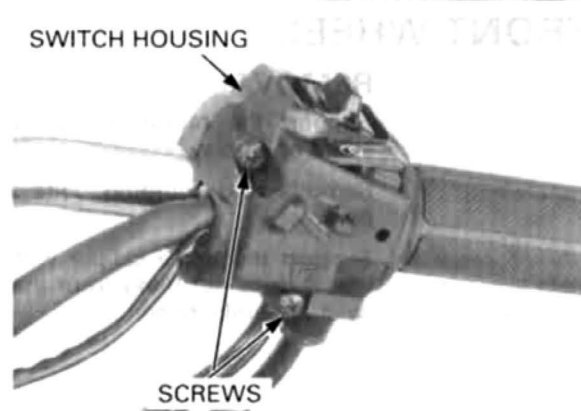
Connect the clutch switch wire connectors.
Install the left rearview mirror.



Install the right handlebar switch/throttle housing by aligning its locating pin with the hole in the handlebar.



Tighten the forward screw first, then the rear screw.



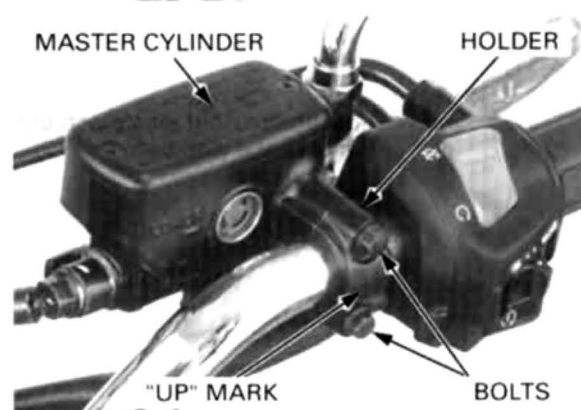
Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, the lower bolt.

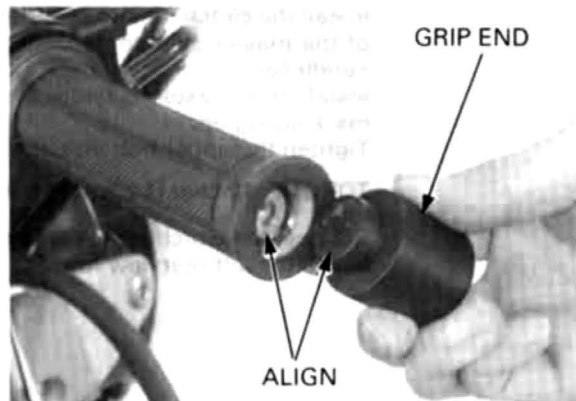
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake switch wire connectors.
Install the right rearview mirror.



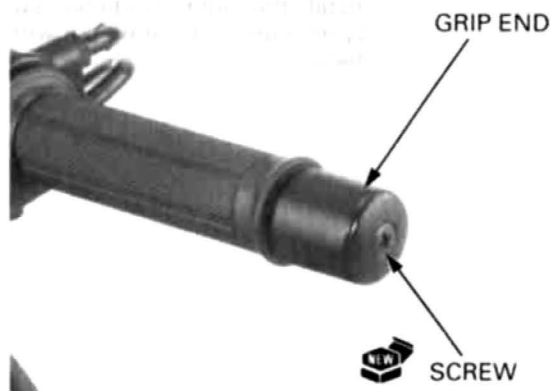
FRONT WHEEL/SUSPENSION/STEERING

Install the grip end while aligning it cut-out with the inner weight.



Install and tighten the new mounting screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



FRONT WHEEL

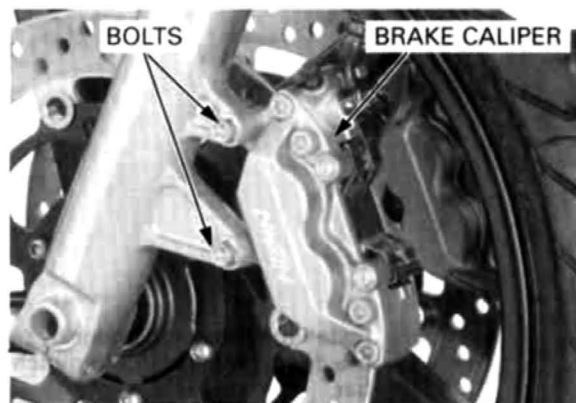
REMOVAL

Support the motorcycle securely using a safety stand or a hoist.

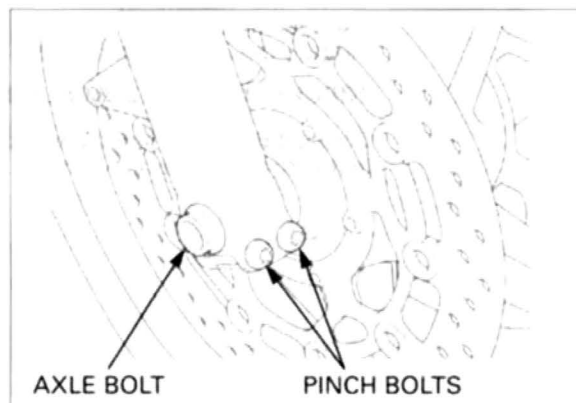
Remove the mounting bolts and both brake calipers.

Do not operate the brake lever after the brake caliper is removed.

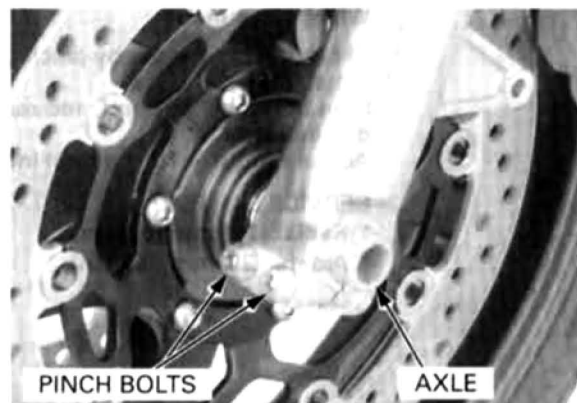
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



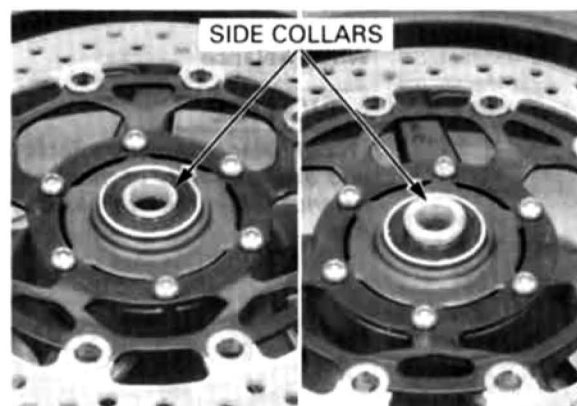
Loosen the right axle pinch bolts.
Remove the axle bolt.



Loosen the left axle pinch bolts.
Remove the axle and the front wheel.



Remove the side collars.

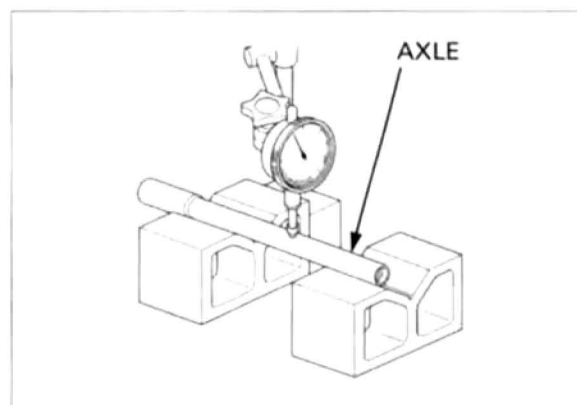


INSPECTION

Axle

Set the axle in V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



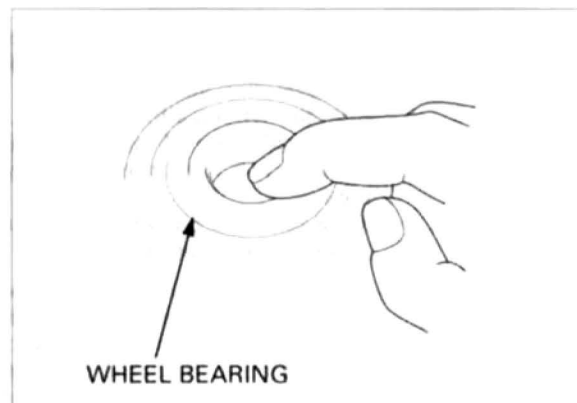
Wheel bearing

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the bearings in pairs.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the new bearings, if necessary (page 13-15).



Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.

Spin the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

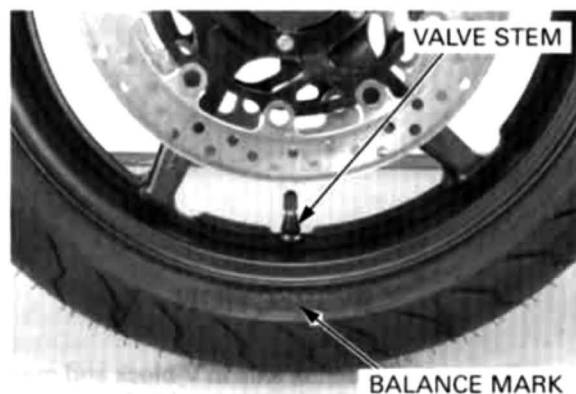


For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

Wheel balance

NOTICE

Wheel balance directly affects the stability, handling and over all safety of the motorcycle. Always check balance when the tire has been removed from the rim.



Note the rotating direction marks on the wheel and tire.



Remove the dust seals from the wheel.

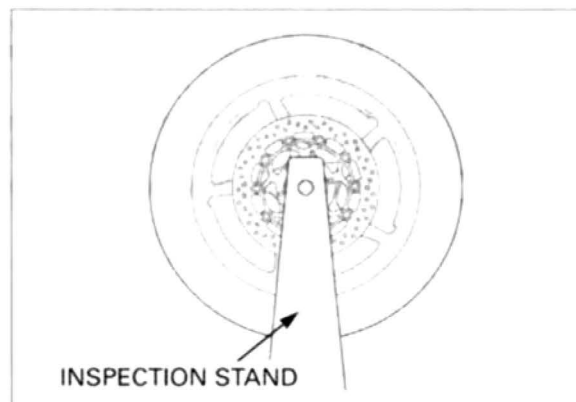
Mount the wheel, tire and brake discs assembly in an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.

Do this two or three times to verify the heaviest area.

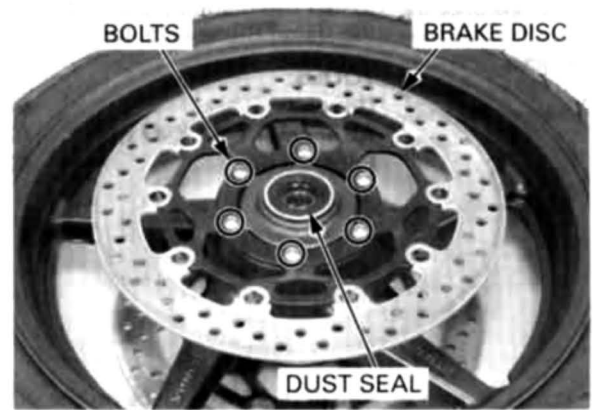
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



DISASSEMBLY

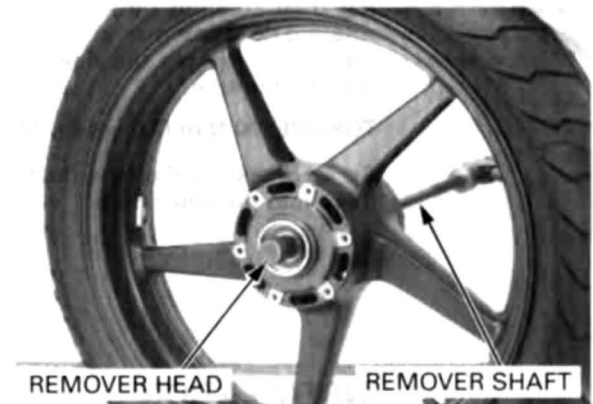
Remove the bolts and brake discs.
Remove the dust seals.



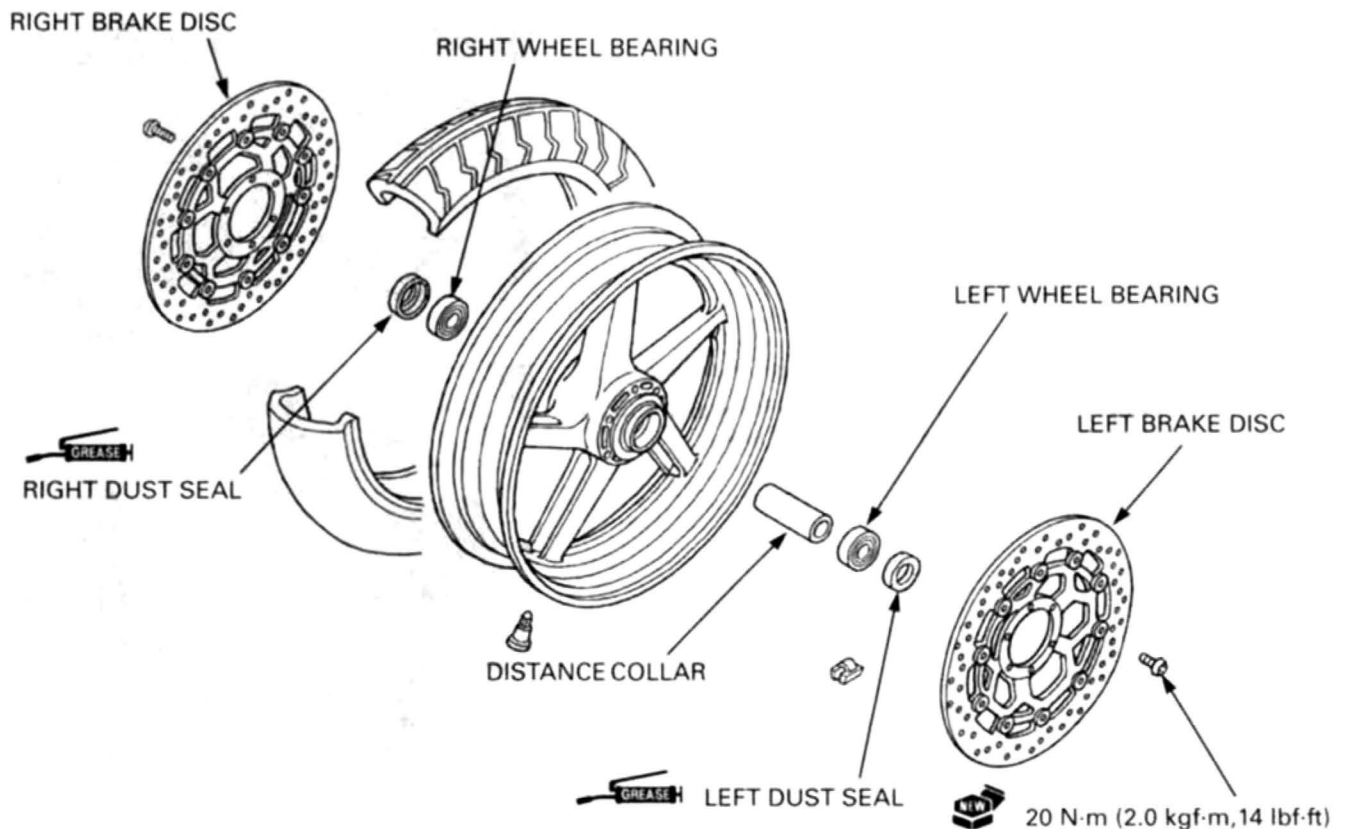
Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm 07746-0050600
Bearing remover shaft 07GGD-0010100



ASSEMBLY



FRONT WHEEL/SUSPENSION/STEERING

Never install the old bearings. Once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely. Install the distance collar, then drive in the left bearing using the special tool.

TOOLS:

Driver

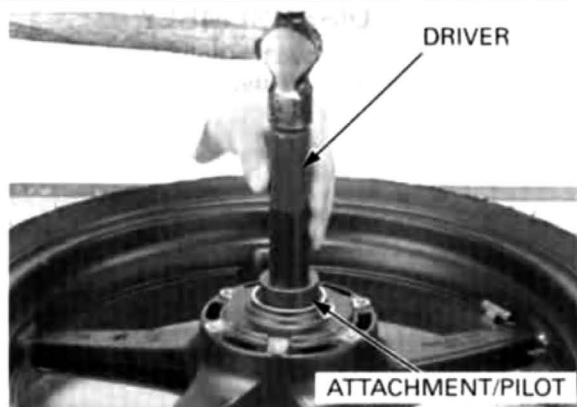
07749-0010000

Attachment, 42 X 47 mm

07746-0010300

Pilot, 20 mm

07746-0040500



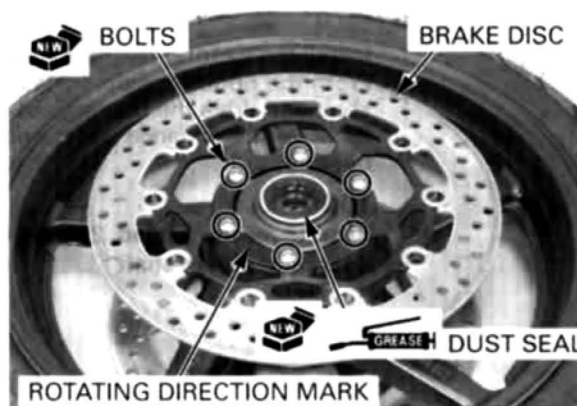
Do not get grease on the brake discs or stopping power will be reduced

Install the brake discs on the wheel hub while aligning their rotating direction marks with the wheel rotating direction marks.

Install and tighten the new mounting bolts to the specified torque.

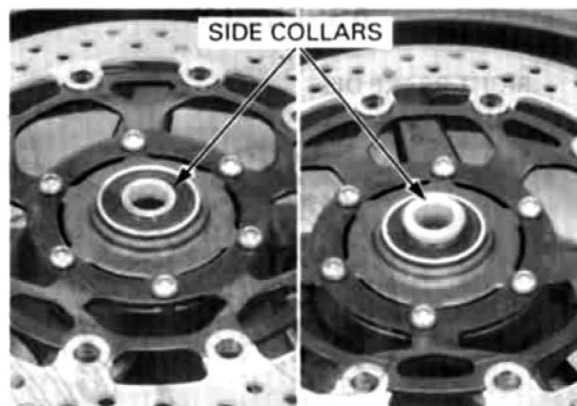
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Apply grease to the new dust seal lips, then install them into the wheel hub.



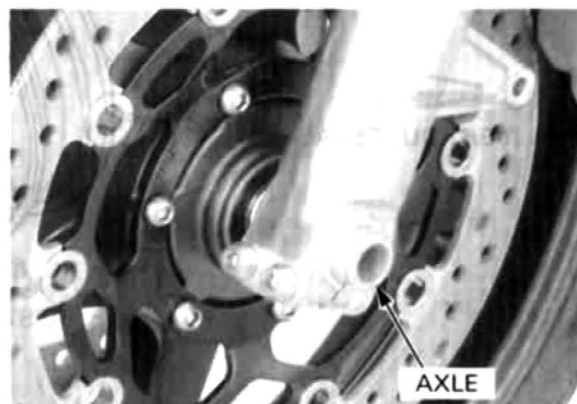
INSTALLATION

Install the side collars.



Install the front wheel between the fork legs.

Apply thin layer of grease to the front axle surface. Install the front axle from the left side.

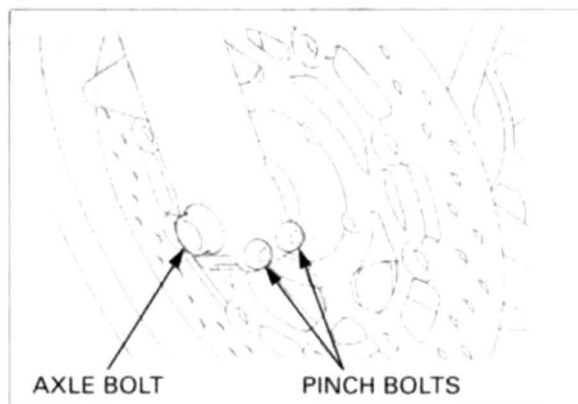


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

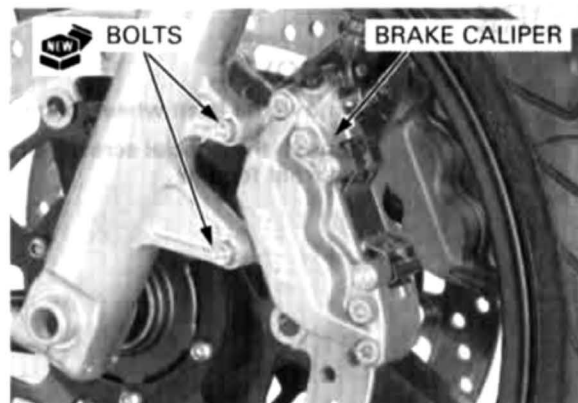
Tighten the right axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the both brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

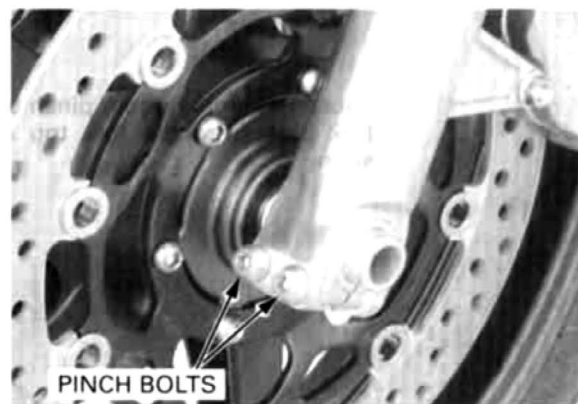


With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation by applying the brake lever.



Tighten the left axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Check the clearance between the brake disc and caliper on each side after installation.
The clearance should be at least 0.7 mm (0.03 in).

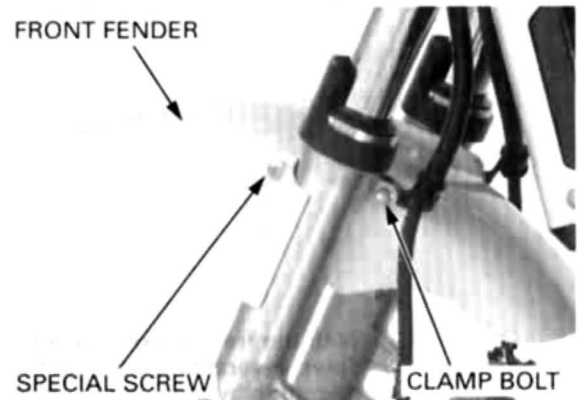


FORK

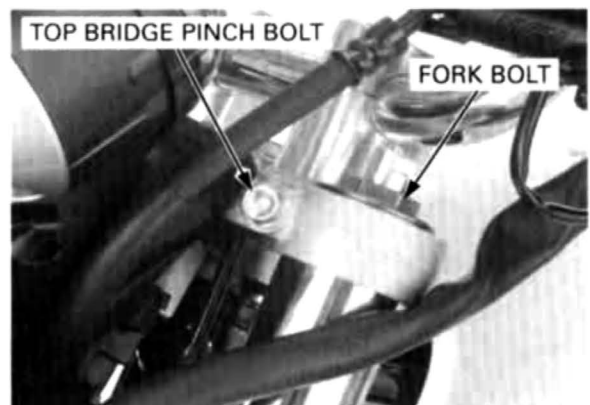
REMOVAL

Remove the front wheel (page 13-12)

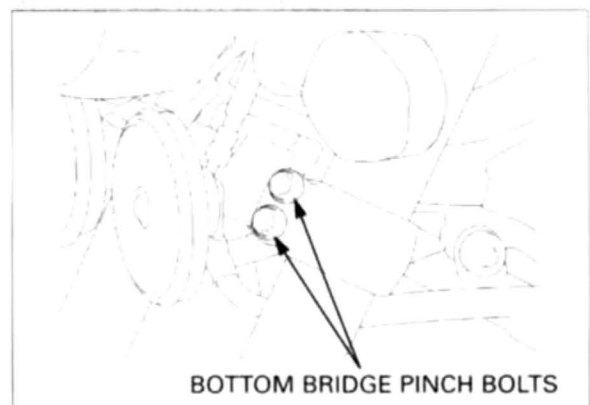
Remove the special screws, brake hose clamp bolts and front fender.



Loosen the top bridge pinch bolt.
When the fork leg will be disassembled, loosen the fork bolt, but do not remove it yet.



Loosen the fork bottom pinch bolts and remove the fork pipe from the fork top bridge and steering stem.



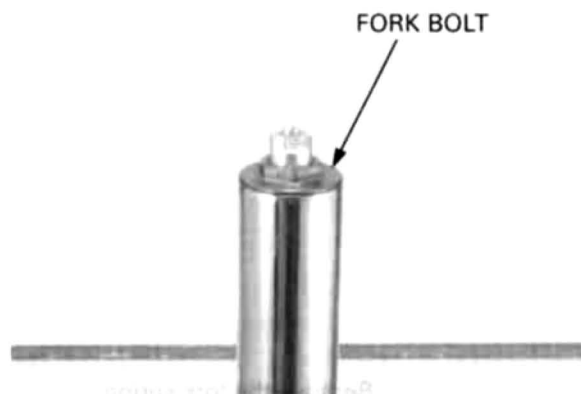
DISASSEMBLY

Be careful not to scratch the fork pipe or damage the dust seal.

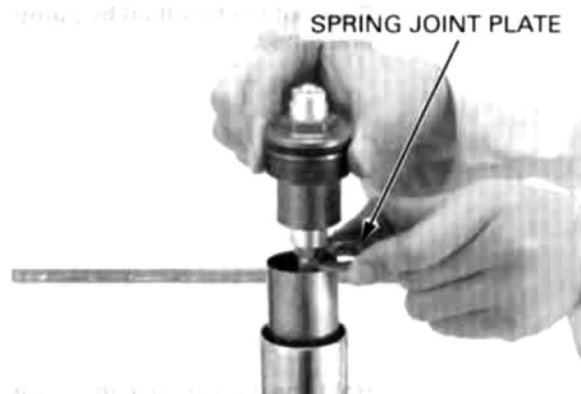
Remove the fork protector by prying it carefully using a screwdriver.



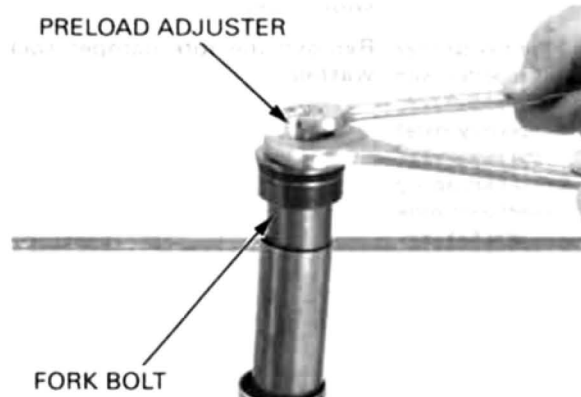
Remove the fork bolt from the fork pipe.



Remove the spring joint plate.



Hold the preload adjuster with a spanner, loosen the fork bolt.

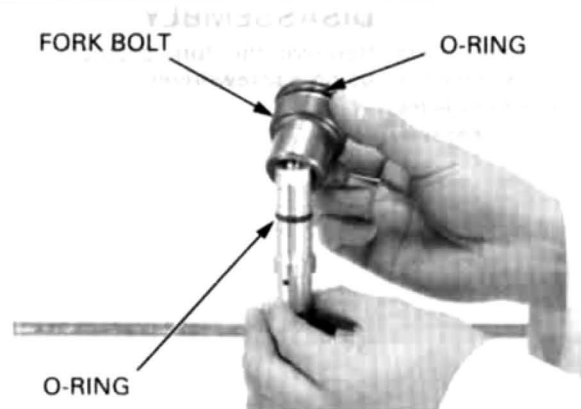


FRONT WHEEL/SUSPENSION/STEERING

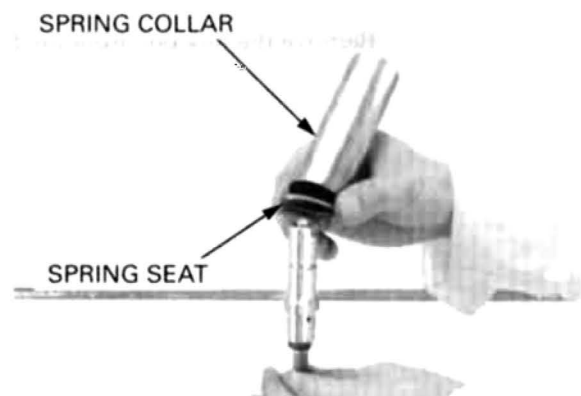
Remove the fork bolt.

Remove the O-ring from the fork bolt.

Remove the O-ring from the preload adjuster.

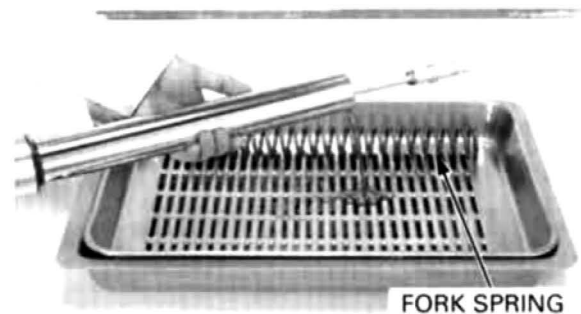


Remove the spring collar and spring seat.



Remove the fork spring.

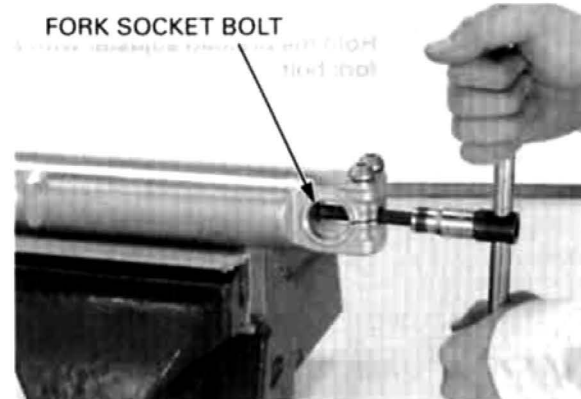
Pour out the fork fluid by pumping the fork pipe several times.



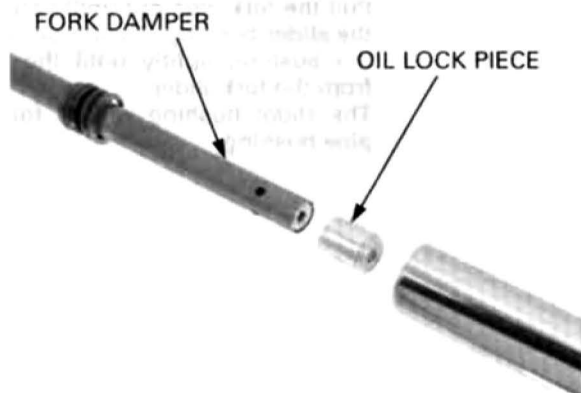
Hold the axle holder in a vice with soft jaws or a shop towel.

Remove the fork damper socket bolt and sealing washer.

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, spring collar, joint plate and fork bolt.



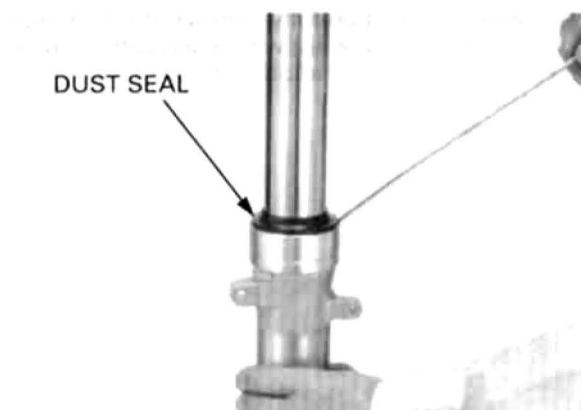
Remove the fork damper assembly and oil lock piece from the fork pipe.



Pour out the fork fluid from the fork damper by pumping the damper rod several times.

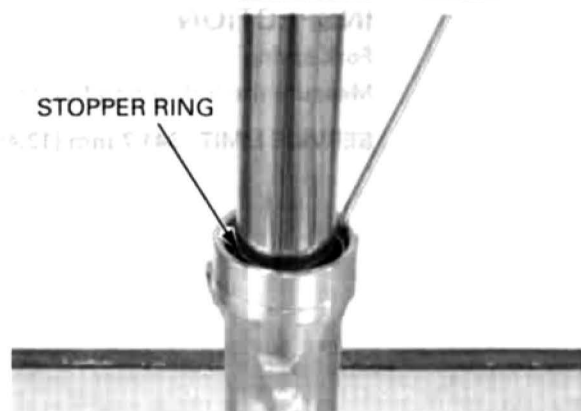


Remove the dust seal.



*Do not scratch the
fork pipe sliding
surface*

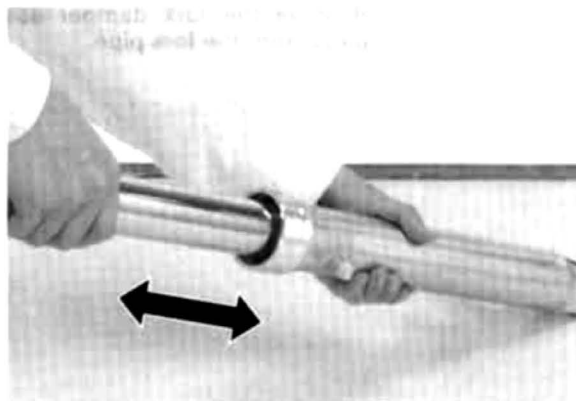
Remove the oil seal stopper ring.



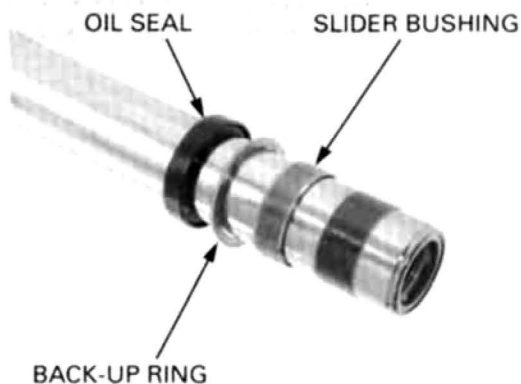
FRONT WHEEL/SUSPENSION/STEERING

Pull the fork pipe out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork pipe separates from the fork slider.

The slider bushing will be forced out by the fork pipe bushing.



Remove the oil seal, back-up ring and slider bushing from the fork pipe.



Do not remove the fork pipe bushing unless it is necessary to replace it with a new one.

Carefully remove the fork pipe bushing by prying the slit with a screwdriver until the bushing can be pulled off by hand.

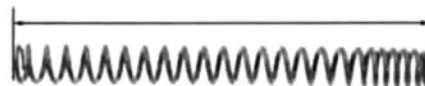


INSPECTION

Fork spring

Measure the fork spring free length.

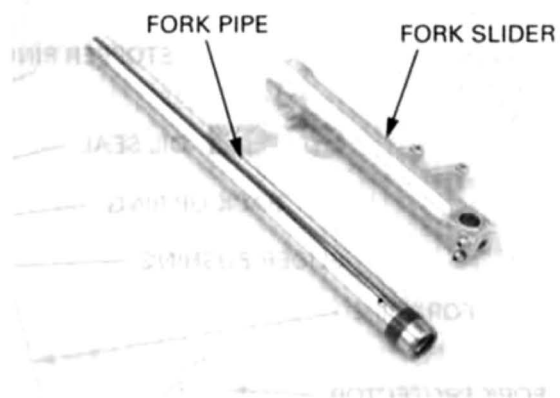
SERVICE LIMIT: 341.7 mm (13.45 in)



Fork pipe/slider/damper

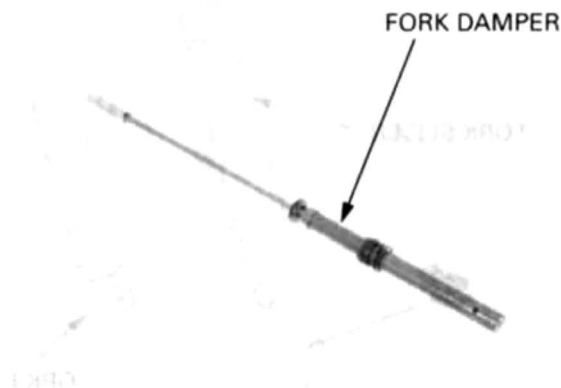
Check the fork pipe and fork slider for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

Replace the fork damper assembly, if any component are damaged.



Check the fork damper for wear or damage.
Check the fork damper rod for bend.
Check the rebound spring for fatigue or damage.
Check the oil lock valve for wear or damage.

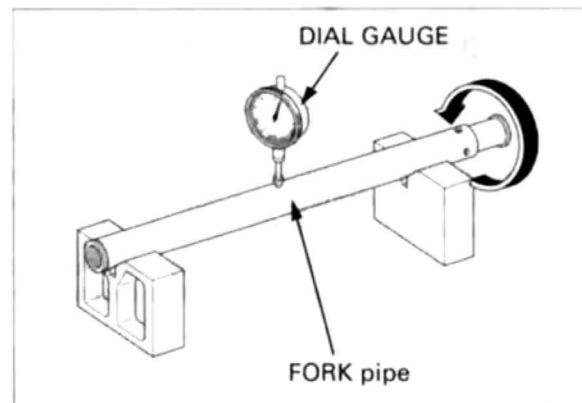
Replace the fork damper assembly if any component is damaged.



Place the fork pipe in V-block and measure the runout.

Actual runout is 1/2 the total indicator reading.

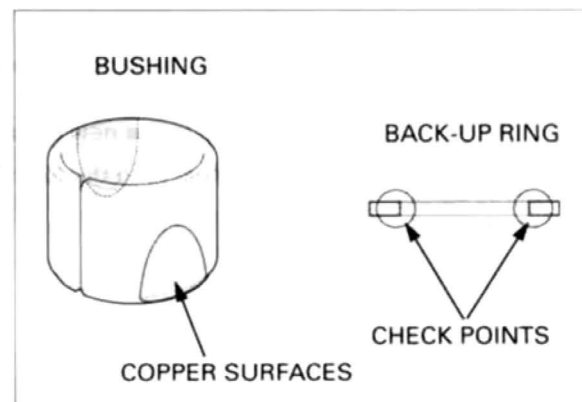
SERVICE LIMIT: 0.20 mm (0.008 in)



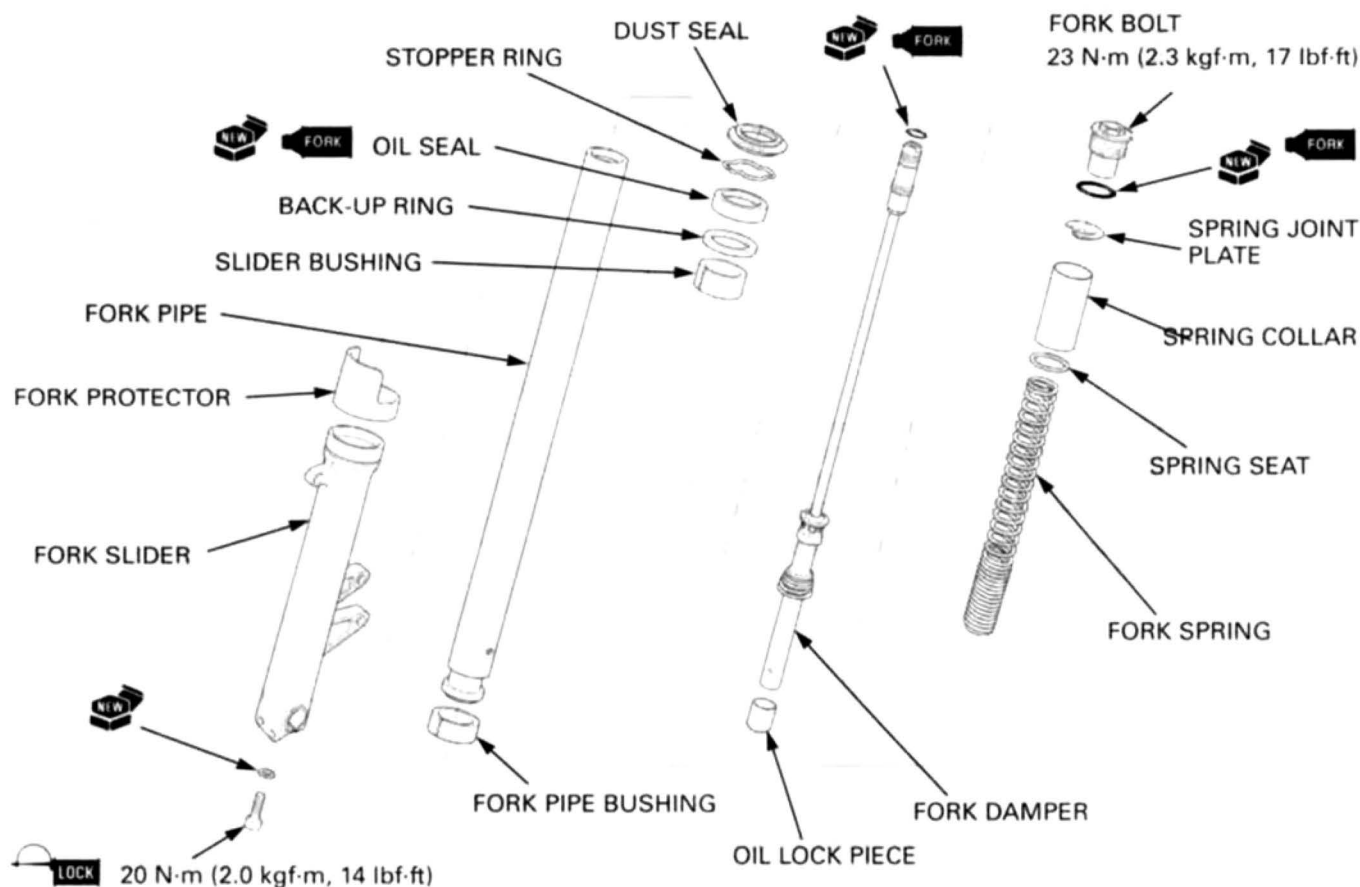
Fork pipe bushing

Visually inspect the slider and fork pipe bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY

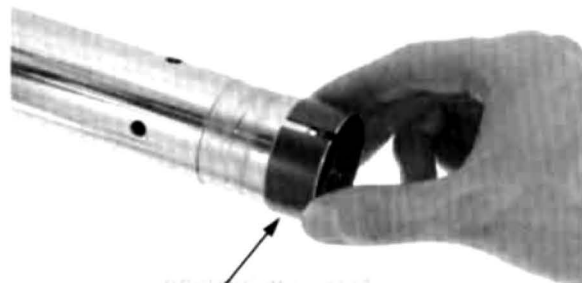


Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

Do not open the bushing slit more than necessary.

Install the new fork pipe bushing being careful not to damage the coating of the bushing if it has been removed.

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.



FORK PIPE BUSHING

Install the slider bushing and back-up ring onto the fork slider.

Apply fork fluid to the new oil seal lips.

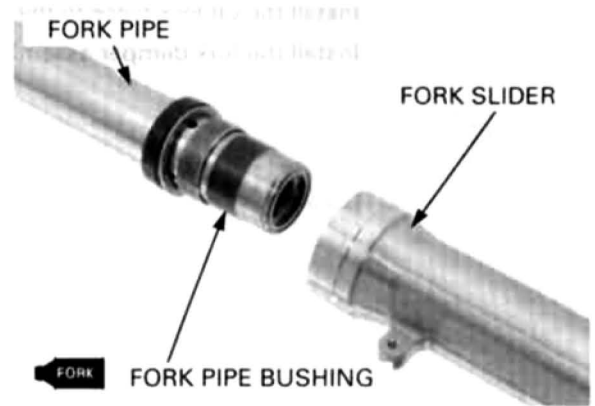
Install the oil seal onto the fork slider.

Install the oil seal with its marked side facing up



BACK-UP RING

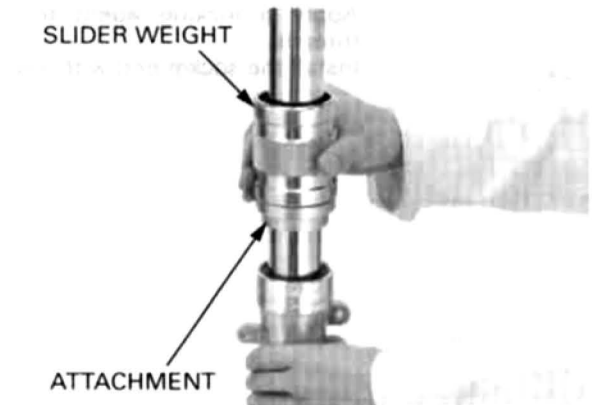
Apply fork fluid to the fork pipe bushing.
Install the fork slider into the fork pipe.



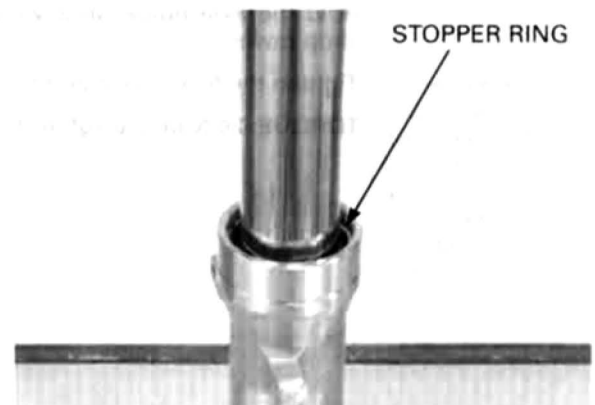
Drive the oil seal in using the special tool.

TOOLS:

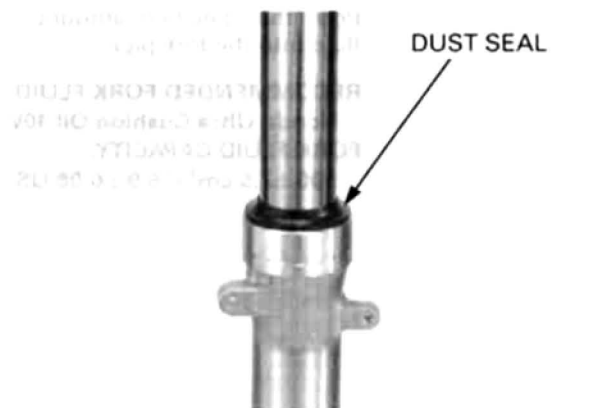
Slider weight	07947-KA50100
Seal driver attachment	07947-KA40200



Install the stopper ring into the fork slider groove securely.

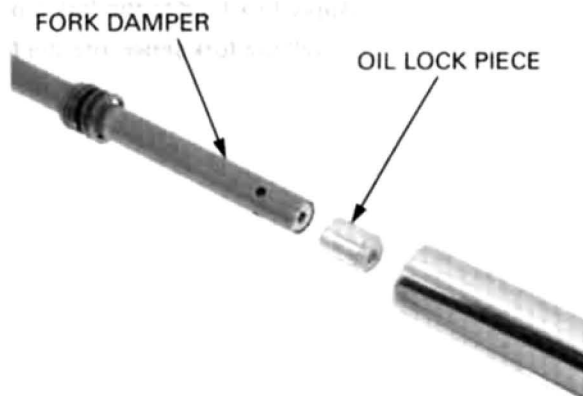


Install the dust seal.



FRONT WHEEL/SUSPENSION/STEERING

Install the oil lock piece to the fork damper.
Install the fork damper assembly into the fork slider.



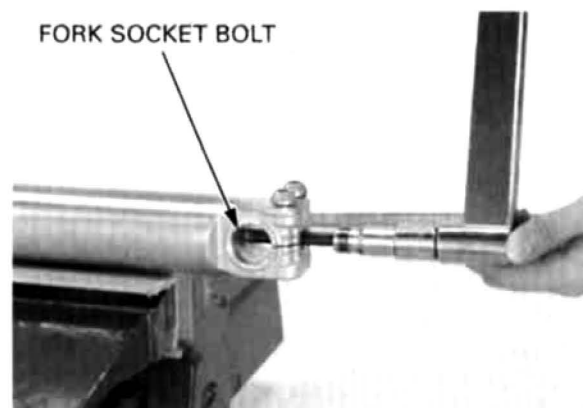
Apply a locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer.



Hold the axle holder in a vise with soft jaws or a shop towel.

Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, spring collar, joint plate and fork bolt.

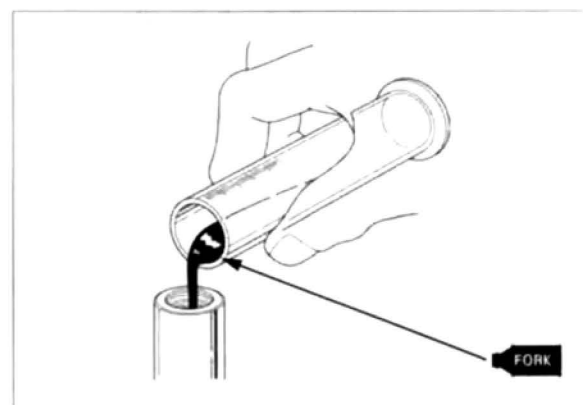
Pour the specified amount of recommended fork fluid into the fork pipe.

RECOMMENDED FORK FLUID:

Honda Ultra Cushion Oil 10W or equivalent

FORK FLUID CAPACITY:

$500 \pm 2.5 \text{ cm}^3$ (16.9 \pm 0.08 US oz, 17.6 \pm 0.09 Imp oz)



Pump the damper rod several times until the fork fluid flow out of the oil hole in the rebound damping adjuster.

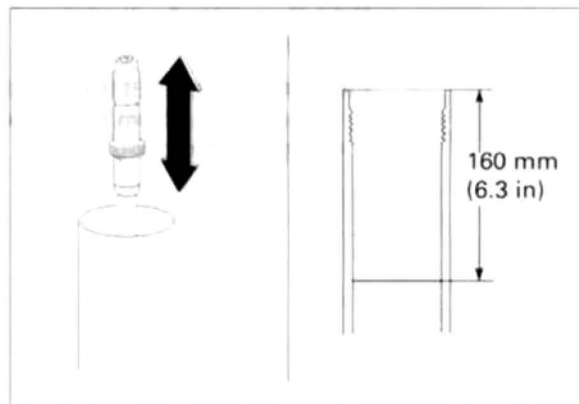
Slowly pump the fork pipe several times to remove the trapped air.

Compress the fork pipe slowly.

Measure the oil level from the top of the fork pipe.

FORK OIL LEVEL: 160 mm (6.3 in)

Be sure the oil level is the same in the both forks

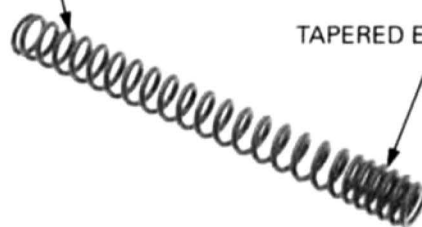


Extend the fork damper fully.

Install the fork spring with the tapered end facing down.

FORK SPRING

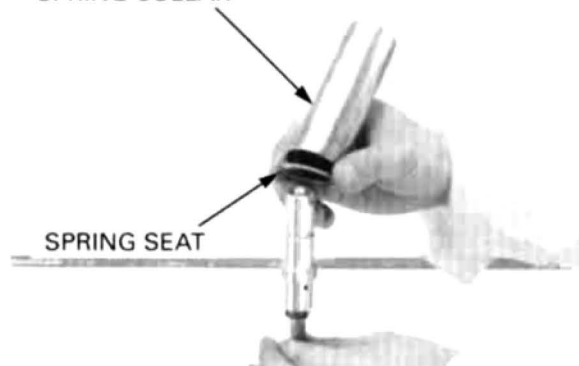
TAPERED END



Install the spring seat and spring collar.

SPRING COLLAR

SPRING SEAT



Apply fork fluid to the new O-ring and install it into the preload adjuster groove.

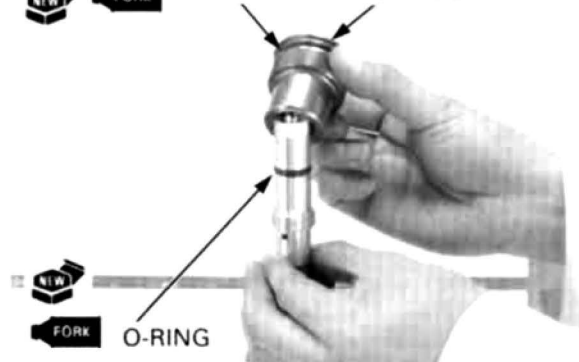
Apply fork fluid to the new O-ring and install it into the fork cap groove.

Install the fork cap onto the preload adjuster.



O-RING

FORK BOLT

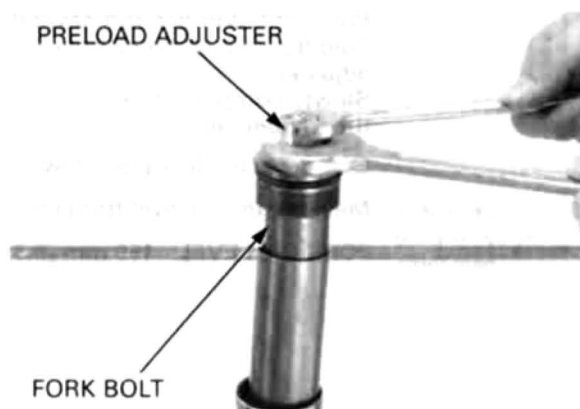


FRONT WHEEL/SUSPENSION/STEERING

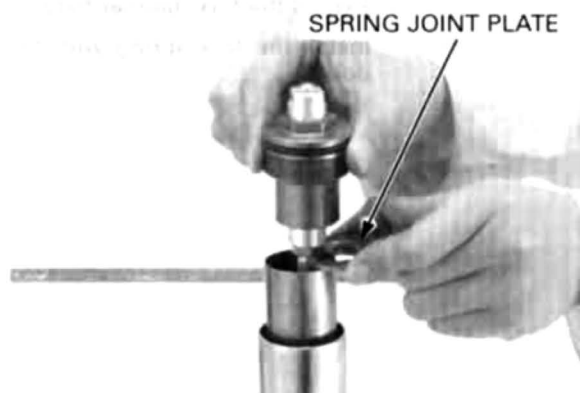
Hold the preload adjuster and screw the fork bolt and adjust the preload adjuster as shown.

PRELOAD ADJUSTER INITIAL SETTING:

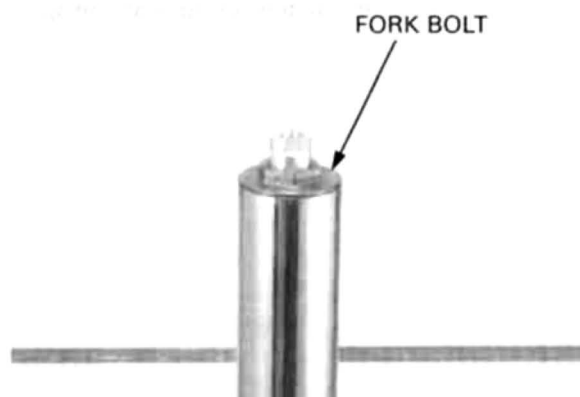
**14 mm (0.6 in) from top surface of fork cap
4th groove from top**



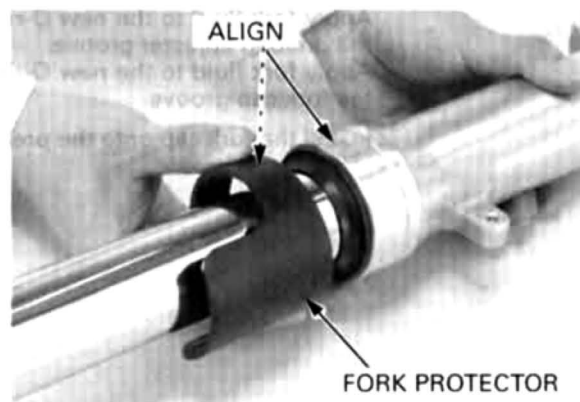
Install the spring joint plate.



Screw the fork bolt into the fork pipe.



Install the fork protector.

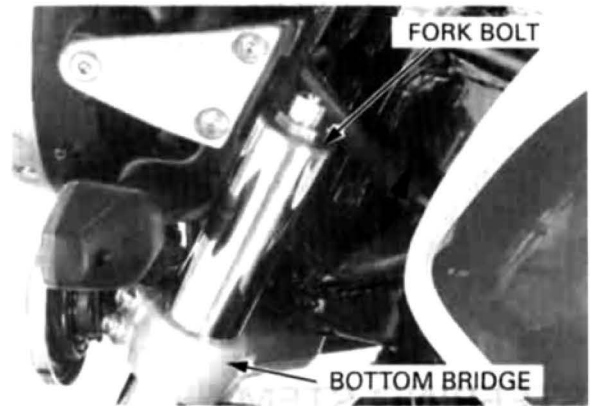


INSTALLATION

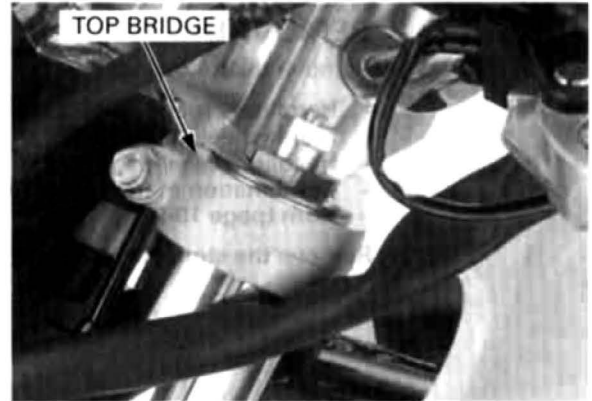
Install the fork leg through the bottom bridge, temporarily tighten the bottom bridge pinch bolt.

Tighten the fork bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

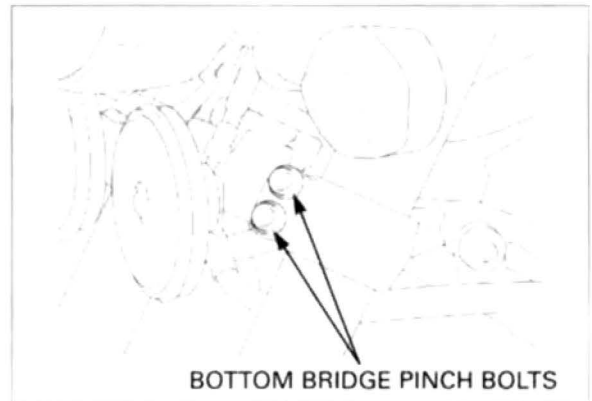


Loosen the bottom bridge pinch bolts and pull up the fork leg so that the top surface end of the fork pipe flush with the top bridge upper surface.



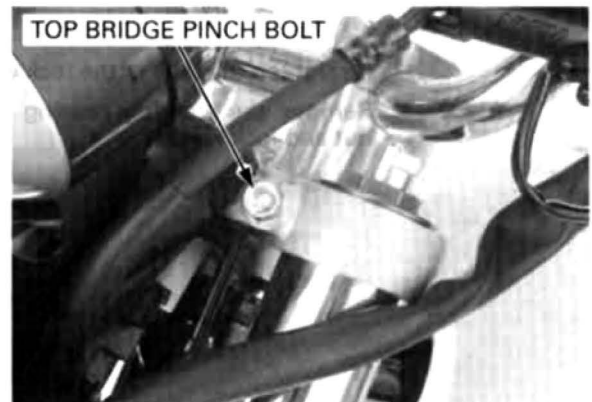
Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Tighten the top bridge pinch bolt to the specified torque.

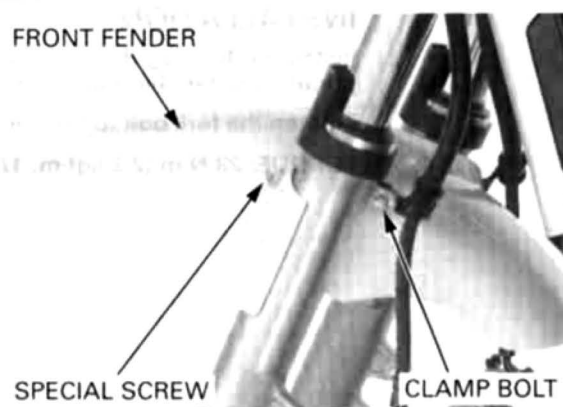
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Install the front fender and brake hose clamps, tighten the bolts securely.

Install the front wheel (page 13-16).



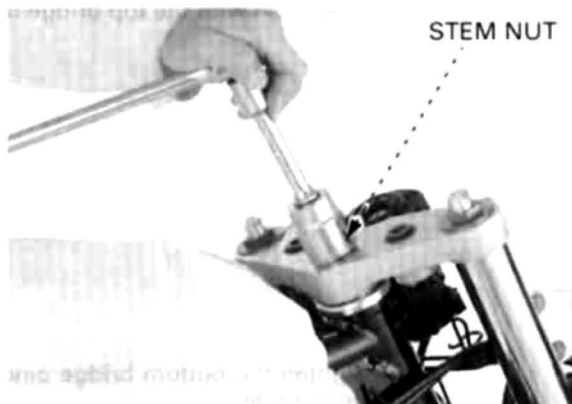
STEERING STEM

REMOVAL

Remove the following:

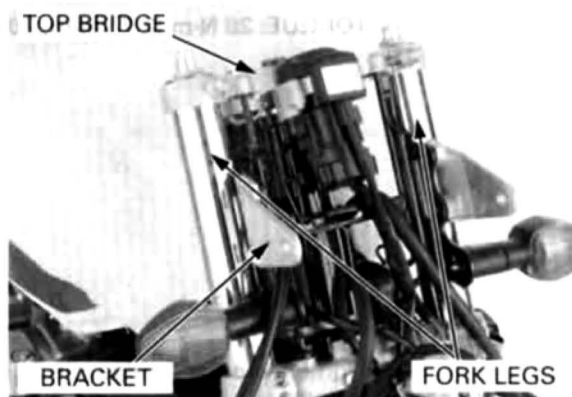
- Handlebar (page 13-6)
- Front wheel (page 13-12)
- Headlight case (page 19-7)
- Combination meter (page 19-11)
- Horn (page 19-27)

Remove the stem nut.



Remove the fork legs (page 13-18).

Remove the top bridge and headlight/turn signal bracket.



Straighten the tabs of the lock washer.

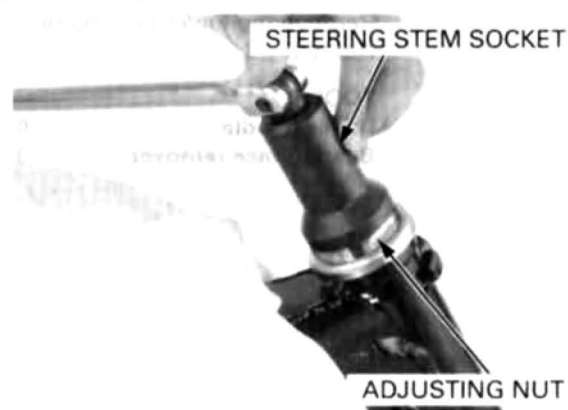
Remove the steering bearing adjustment nut lock nut and lock washer.



Remove the steering stem bearing adjusting nut using the special tool.

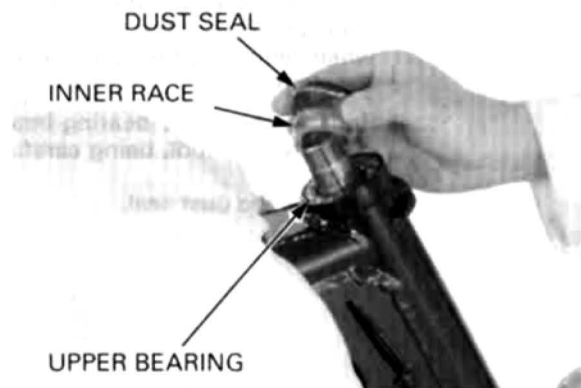
TOOL:

Steering stem socket 07916-3710101



Remove the following:

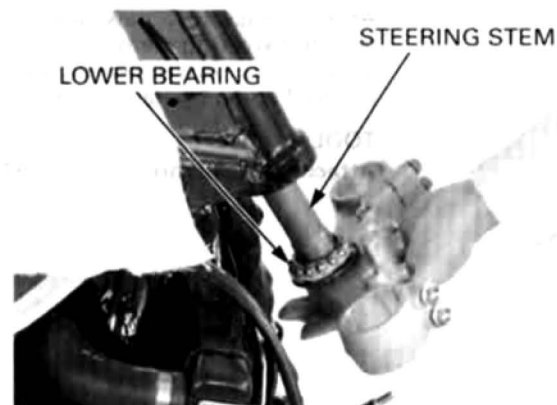
- Upper dust seal
- Upper bearing inner race
- Upper bearing



Remove the following:

- Steering stem
- Lower bearing

Check the bearings and races for wear or damage.



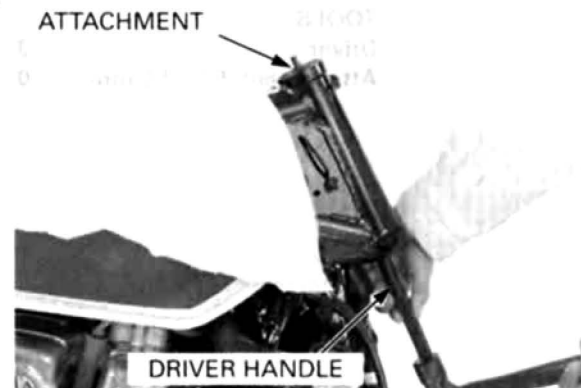
BEARING OUTER RACE REPLACEMENT

Always replace the bearings and races as a set.

Remove the upper bearing outer races using the special tool.

TOOLS:

Driver handle 07953-MJ10200
Driver attachment 07953-MJ10100



FRONT WHEEL/SUSPENSION/STEERING

Remove the lower bearing outer race using the special tool.

TOOLS:

Driver handle

07953-MJ10200

Bearing race remover

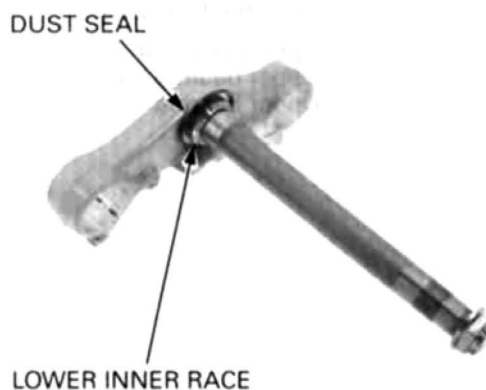
07946-3710500



Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.



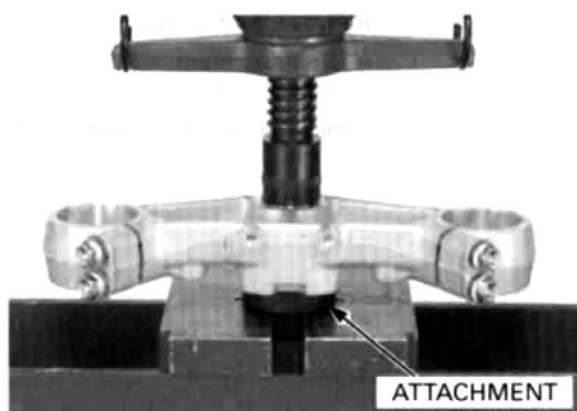
Apply grease to a new dust seal lips and install it over the steering stem.

Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:

Attachment, 30 mm

07746-0030300



Drive the new lower bearing outer races into the steering head pipe using the special tools.

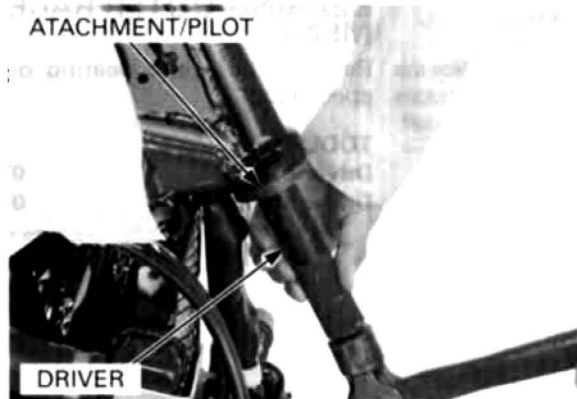
TOOLS:

Driver

07749-0010000

Attachment, 52 X 55 mm

07746-0010400



Drive the new upper bearing outer races into the steering head pipe using the special tools.

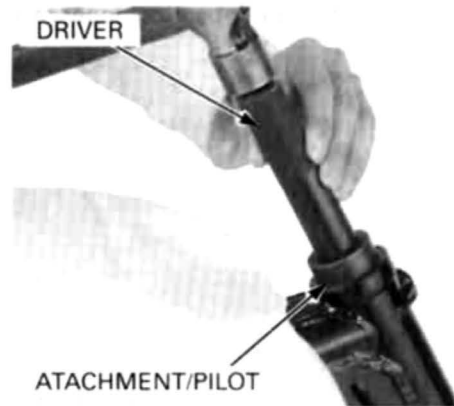
TOOLS:

Driver

07749-0010000

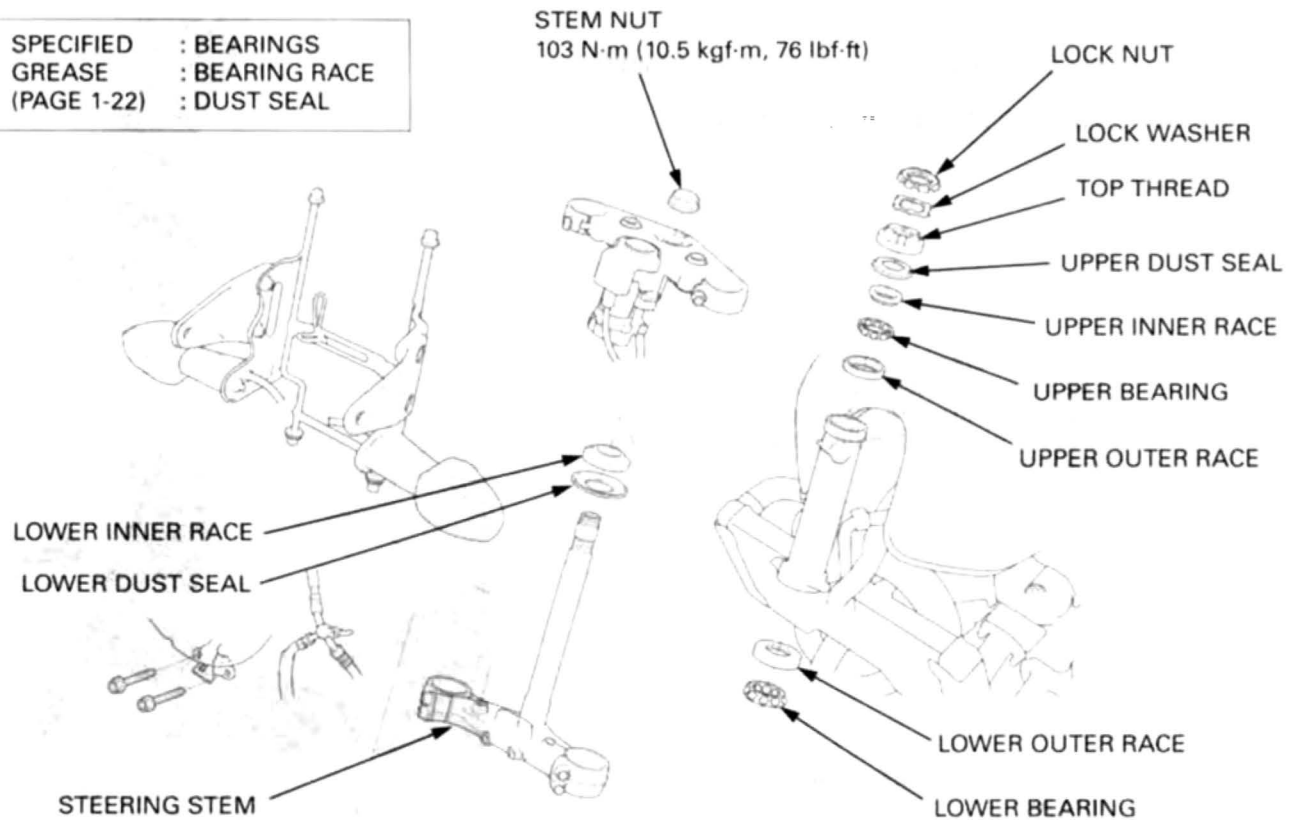
Attachment, 37 X 40 mm

07746-0010300



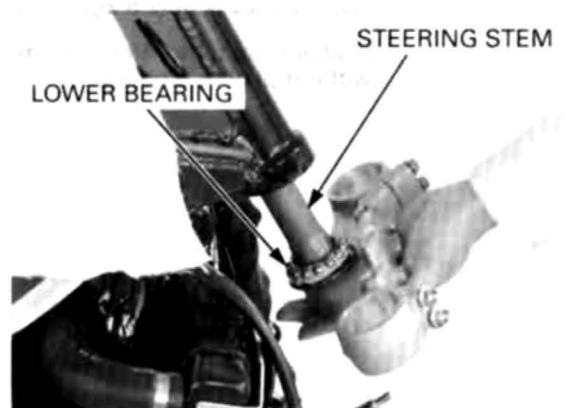
INSTALLATION

SPECIFIED : BEARINGS
GREASE : BEARING RACE
(PAGE 1-22) : DUST SEAL



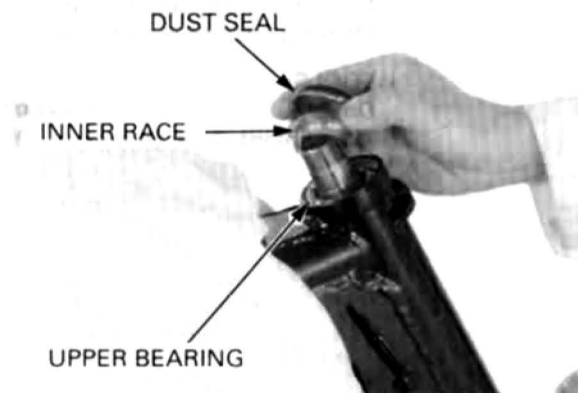
Apply specified grease (page 1-22) to upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem.
Insert the steering stem into the steering head pipe.



FRONT WHEEL/SUSPENSION/STEERING

Install upper bearing, inner race and dust seal.

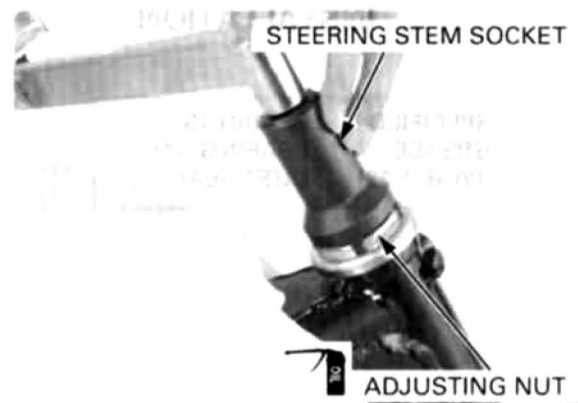


Apply oil to the bearing adjustment nut threads. Install and tighten the stem bearing adjusting nut to the initial torque.

TOOL:

Steering stem socket **07916-3710101**

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



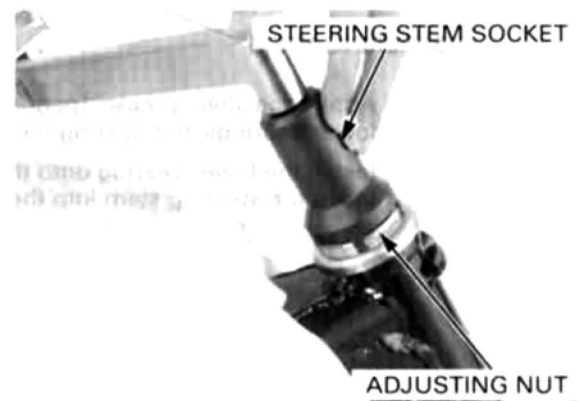
Move the steering stem right and left, lock-to-lock, five times to seat the bearings. Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjustment nut and bend two opposite tabs (shorter) down into the adjustment nut groove.



Install and finger tighten the lock nut.

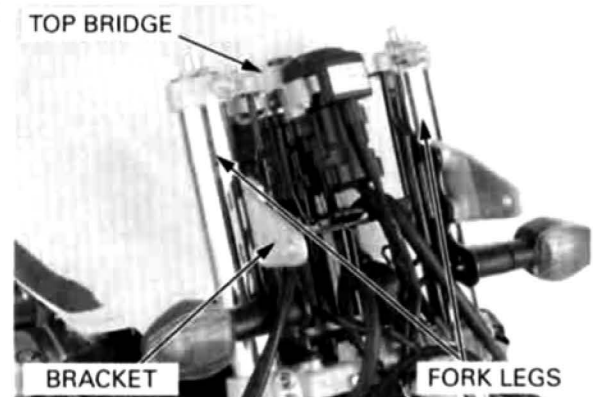
Hold the adjusting nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.



Install the headlight/front turn signal bracket and top bridge.

Install the fork legs (page 13-29).



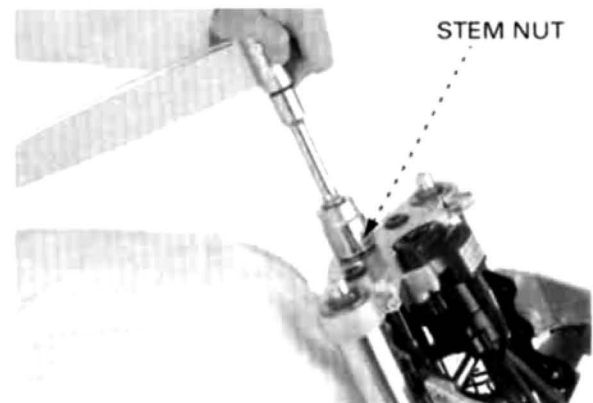
Install the steering stem nut.

Tighten the steering stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Install the following:

- Horn (page 19-27)
- Combination meter (page 19-11)
- Headlight case (page 19-7)
- Front wheel (page 13-16)
- Handlebar (page 13-8)



STEERING HEAD BEARING PRE-LOAD

Jack-up the motorcycle to raise the front wheel off the ground.

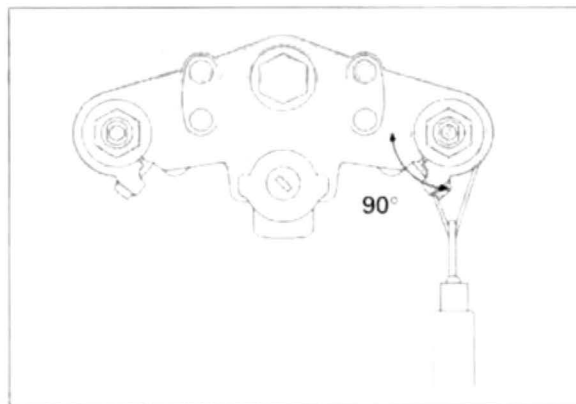
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork pipe and measure the steering head bearing pre-load.

The pre-load should be within 1.0 – 1.5 kgf (2.2 – 3.3 lbf).

If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.

Make sure that there is no cable or wire harness interference.

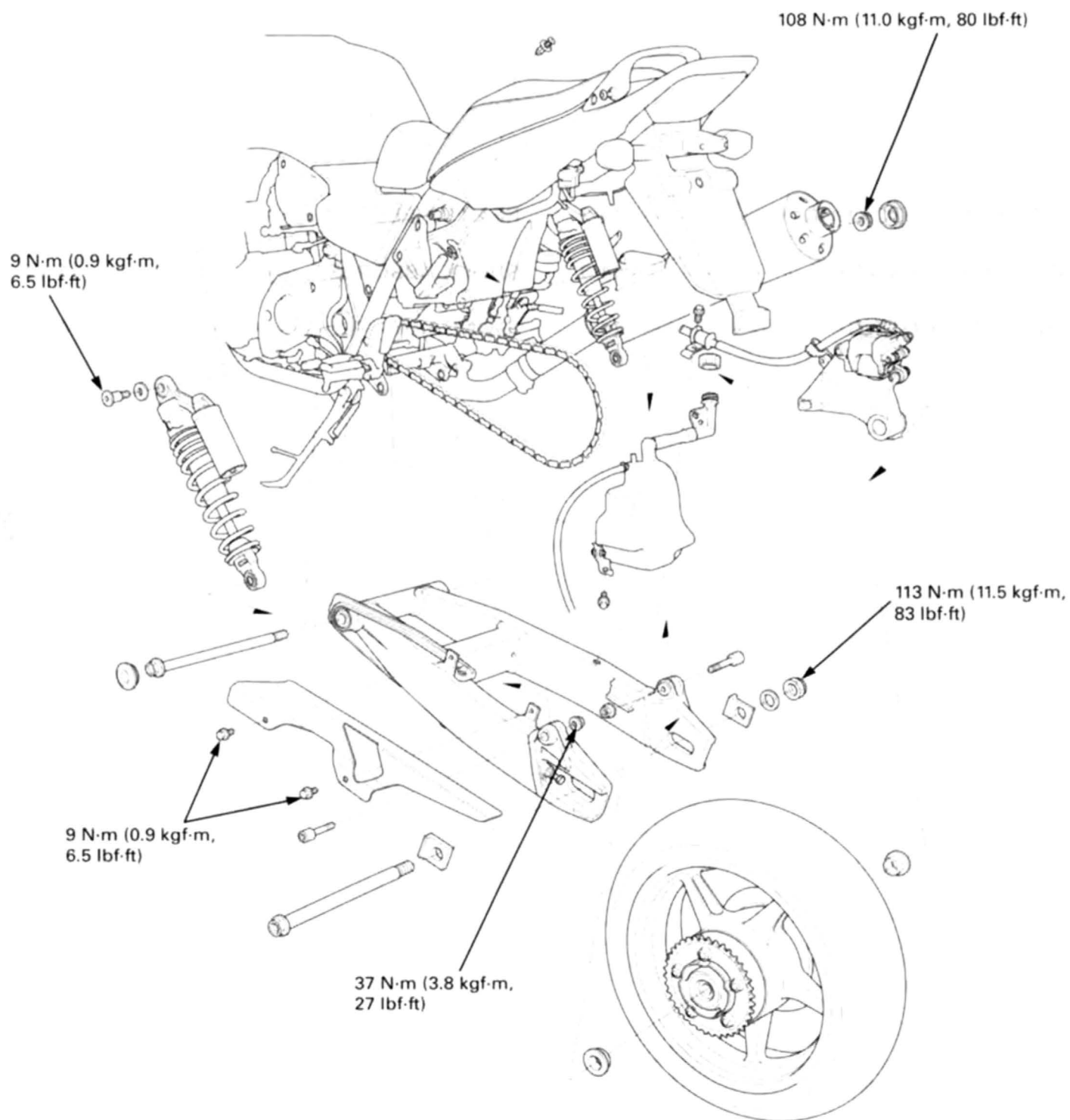


14. REAR WHEEL/SUSPENSION

14-1 REAR WHEEL/SUSPENSION

COMPONENT LOCATION	14-2	REAR WHEEL	14-6
SERVICE INFORMATION	14-3	SHOCK ABSORBER	14-13
TROUBLESHOOTING	14-5	SWINGARM	14-15

REAR WHEEL/SUSPENSION COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen (page 14-14).
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- Refer to the brake system information (page 15-4).

SPECIFICATIONS

Unit: mm (in)






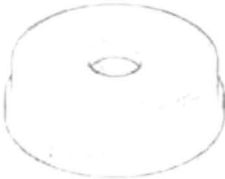





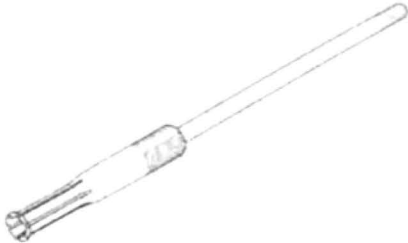
ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			-	2.0 (0.08)
Cold tire pressure	Driver only		290 kPa (2.90 kgf/cm ² , 42 psi)	-
	Driver and passenger		290 kPa (2.90 kgf/cm ² , 42 psi)	-
Axle runout			-	0.2 (0.01)
Wheel rim runout	Radial		-	2.0 (0.08)
	Axial		-	2.0 (0.08)
Wheel balance weight			-	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID50ZVM2-114LE	-
		RK	RK50LF0Z2-114LE	-
	Slack		25 - 35 (1.0 - 1.4)	-
Shock absorber	Spring preload adjuster standard position		2nd position	-
	Rebound adjuster initial setting		10 clicks out from full hard	-

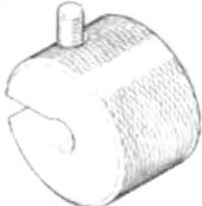


TOEQUE VALUES

Rear axle nut	113 N·m (11.5 kgf·m, 83 lbf·ft)	U-nut
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Final driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Rear shock absorber upper mounting nut	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Rear shock absorber lower mounting nut	37 N·m (3.8 kgf·m, 27 lbf·ft)	U-nut
Swingarm pivot nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut Apply oil to the threads and seating surface.
Drive chain slider flange bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	ALOC bolt: replace with a new one

REAR WHEEL/SUSPENSION

TOOLS

<p>Bearing remover shaft 07GGD-0010100</p> 	<p>Bearing remover head, 25 mm 07746-0050800</p> 	<p>Driver 07749-0010000</p> 
<p>Attachment, 52 X 55 mm 07746-0010400</p> 	<p>Pilot, 25 mm 07746-0040600</p> 	<p>Attachment, 62 X 68 mm 07746-0010500</p> 
<p>Pilot, 28 mm 07746-0041100</p> 	<p>Pilot, 30 mm 07746-0040700</p> 	<p>Driver shaft 07946-MJ00100</p> 
<p>Needle bearing remover 07HMC-MR70100</p> 	<p>Bearing remover handle 07936-3710100</p> 	<p>Bearing remover shaft 07936-3710600</p> 

Remove weight 07741-0010201 	Attachment, 37 X 40 mm 07746-0010200 	Pilot, 20 mm 07746-0040500 
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TROUBLESHOOTING

Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners tightening
- Tire pressure too high

Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

Rear wheel turns hard

- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

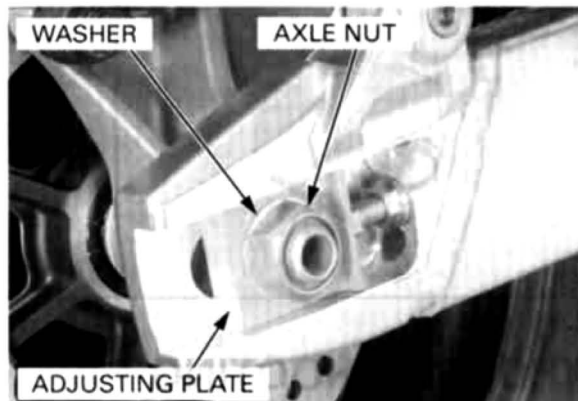
REAR WHEEL

REMOVAL

Loosen the rear axle nut.

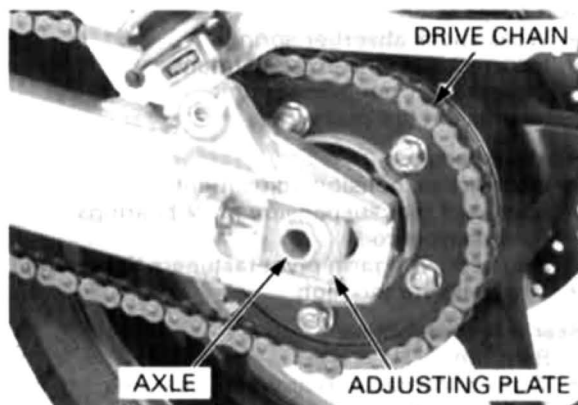
Support the motorcycle using a safety stand or a hoist, raise the rear wheel off the ground.

Remove the axle nut, washer and right drive chain adjusting plate.

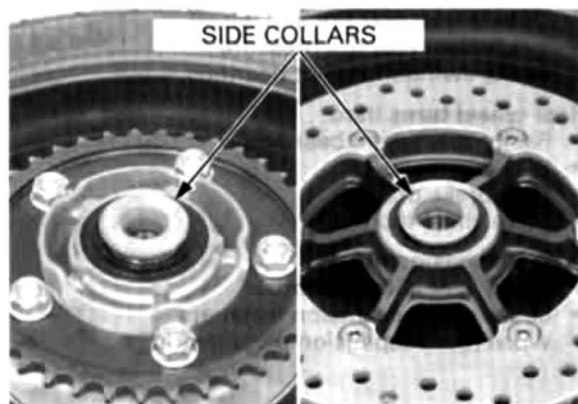


Remove the rear axle and left drive chain adjusting plate.

Move the rear wheel forward, derail the drive chain from the driven sprocket, then remove the rear wheel.



Remove the right and left side collars.

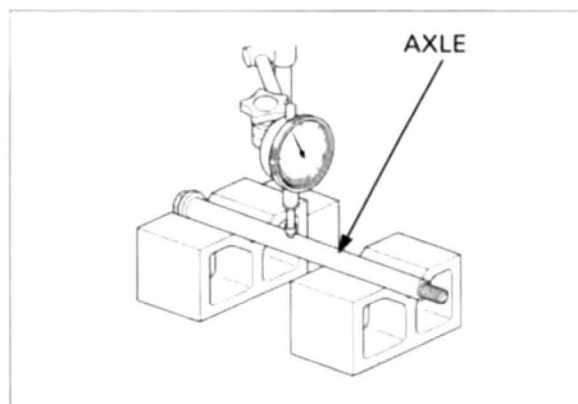


INSPECTION

Axle

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)

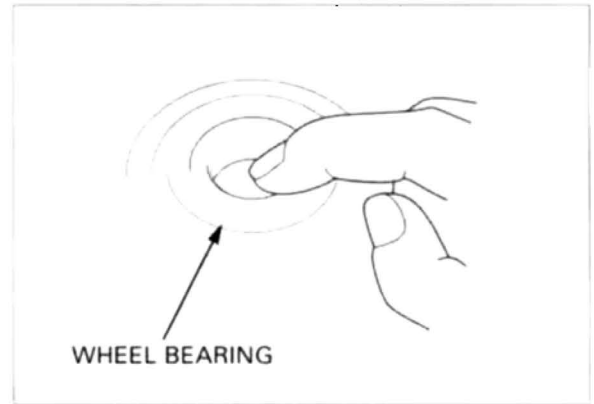


Wheel bearing

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

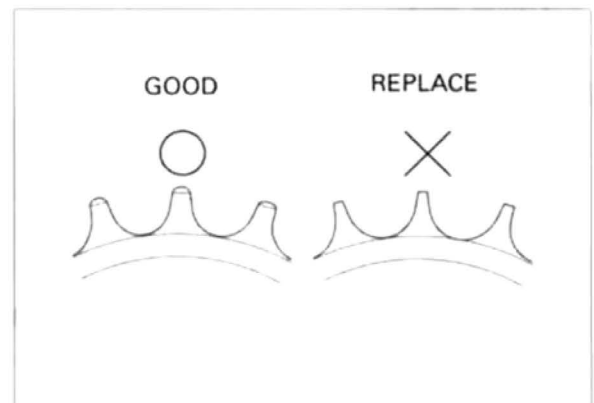


Driven sprocket

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or damaged.

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

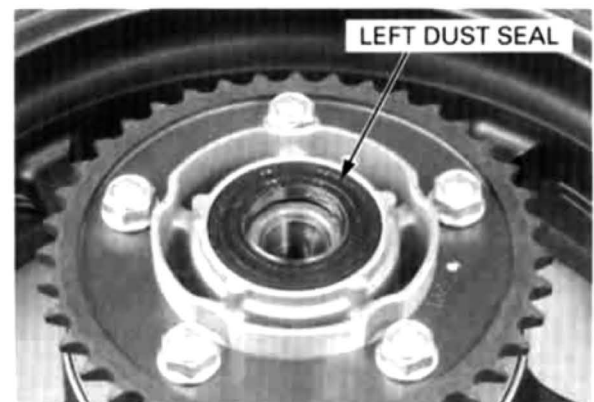


Wheel balance

Refer to the wheel balance servicing (page 13-14).

DISASSEMBLY

Remove the left dust seal.

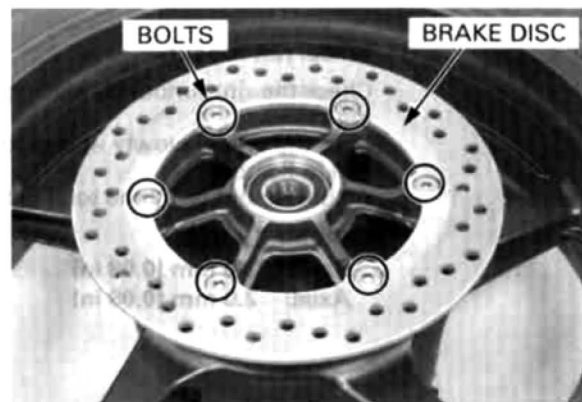


REAR WHEEL/SUSPENSION

Remove the right dust seal.

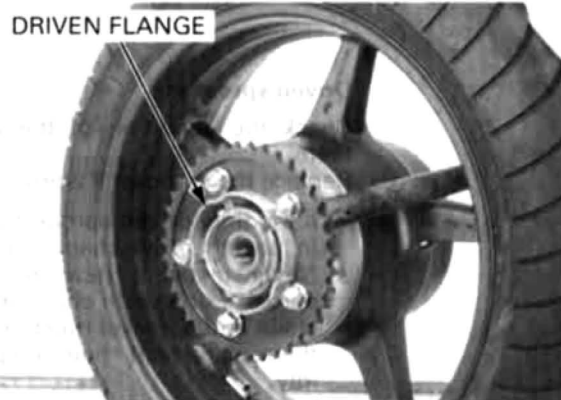


Remove the bolts and brake disc.

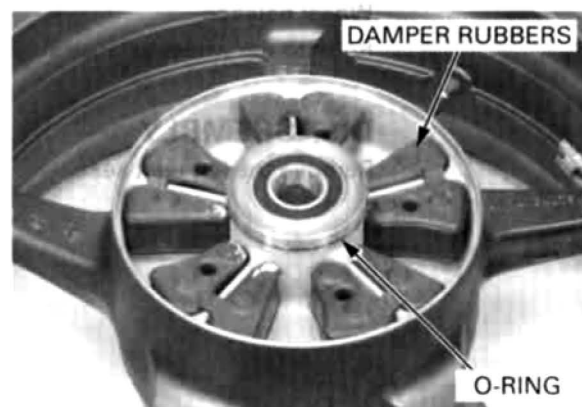


If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.

Remove the driven flange assembly from the left wheel hub.



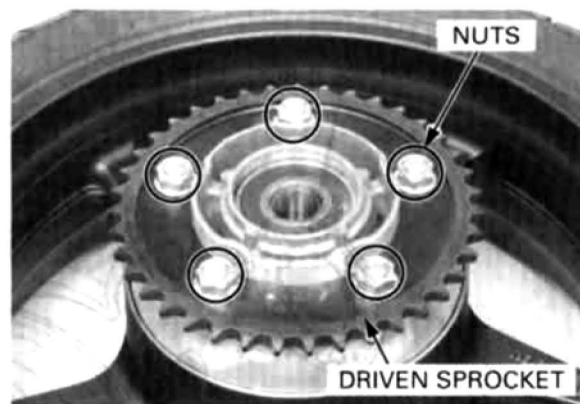
Remove the wheel damper rubbers.
Remove the O-ring.



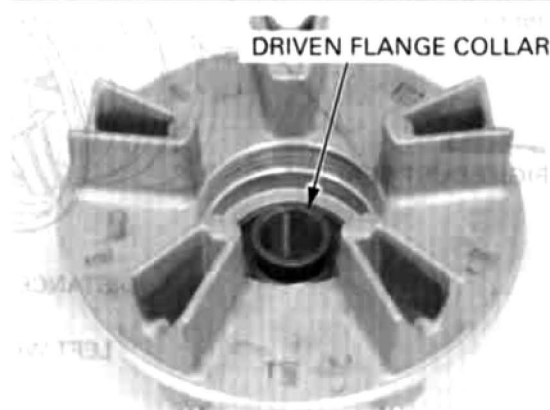
Driven flange bearing removal

Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.



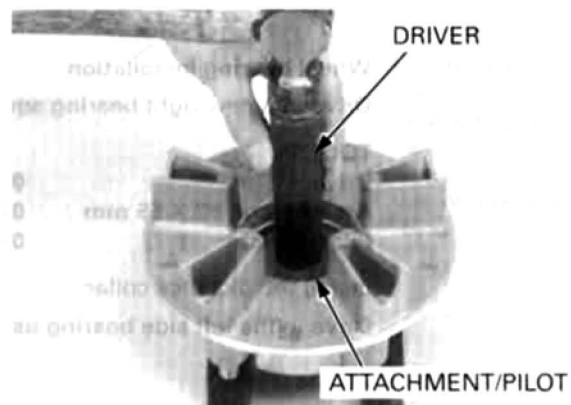
Drive the driven flange collar out from the driven flange bearing.



Drive the driven flange bearing out using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 37 X 40 mm	07746-0010200
Pilot, 25 mm	07746-0040600

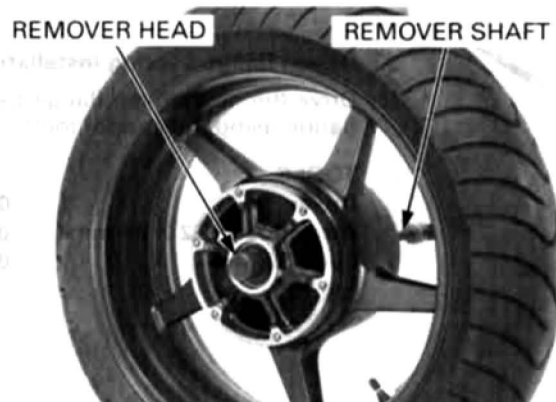


Wheel bearing removal

Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

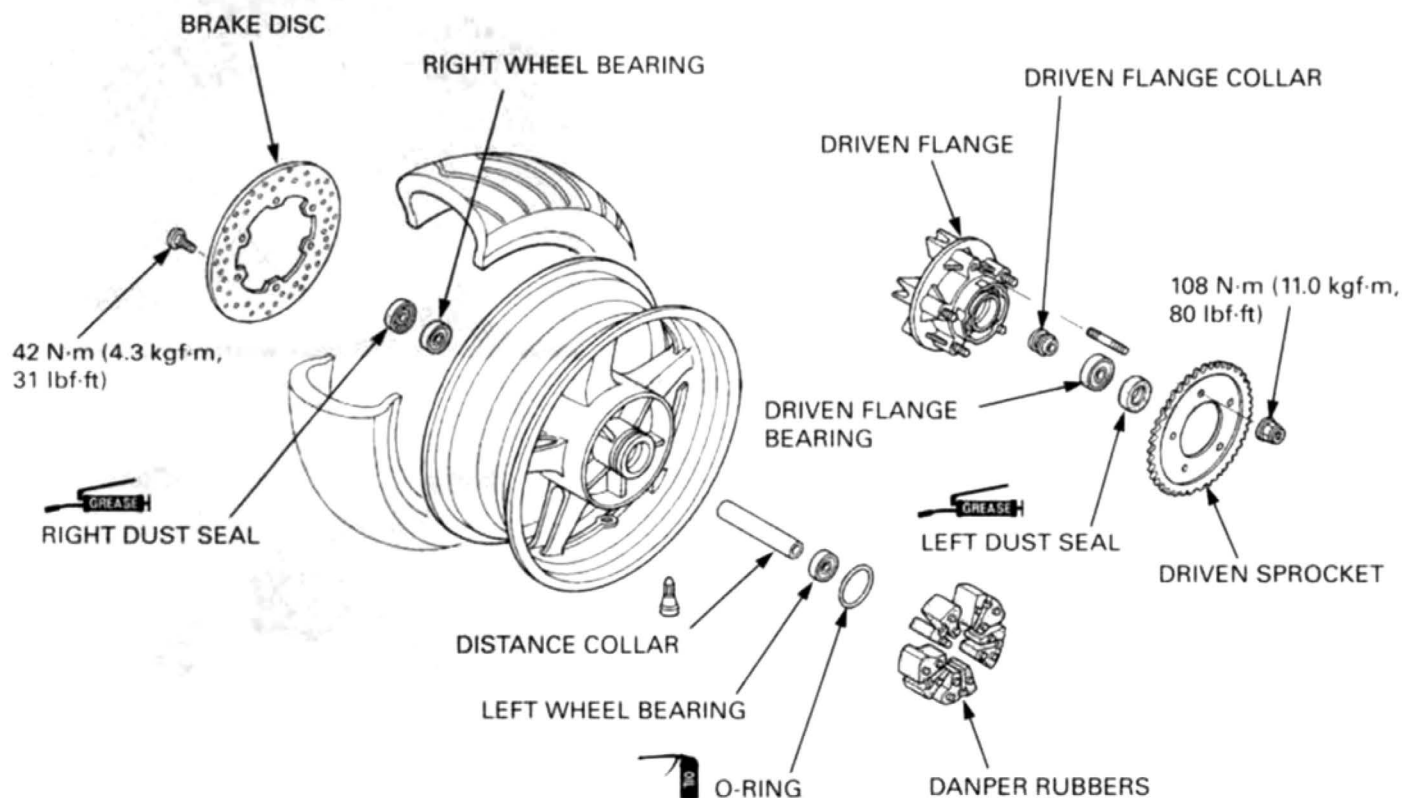
TOOLS:

Bearing remover head, 25 mm	07746-0050800
Bearing remover shaft	07GGD-0010100 or
	07746-0050100



REAR WHEEL/SUSPENSION

ASSEMBLY



Never install the old bearings, once the bearings has been removed, the bearing must be replaced with new ones.

Wheel bearing installation

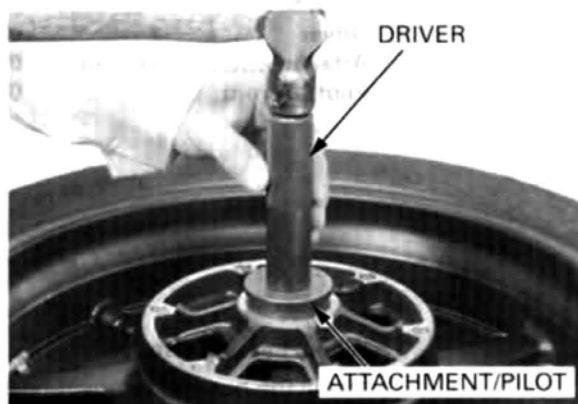
Drive in a new right bearing squarely.

TOOLS:

Driver	07749-0010000
Attachment, 52 X 55 mm	07746-0010400
Pilot, 25 mm	07746-0040600

Install the distance collar

Drive in the left side bearing using the same tools.

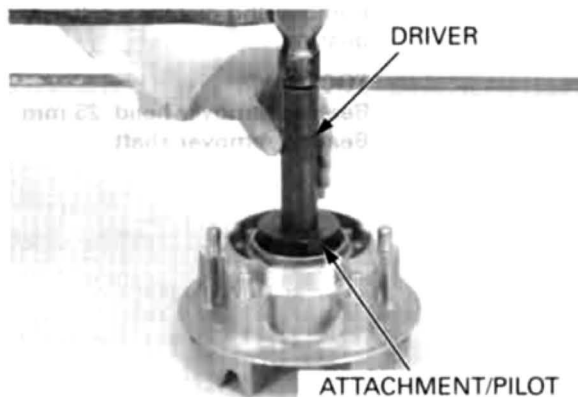


Driven flange bearing installation

Drive the new driven flange bearing into the driven flange using the special tools.

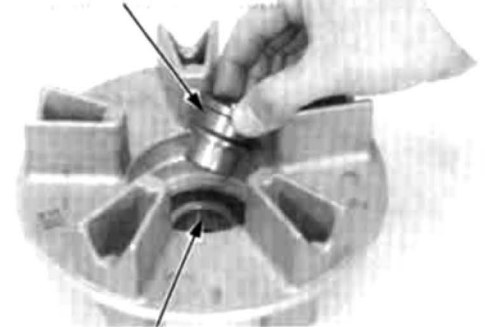
TOOLS:

Driver	07749-0010000
Attachment, 62 X 68 mm	07746-0010500
Pilot, 30 mm	07746-0040700



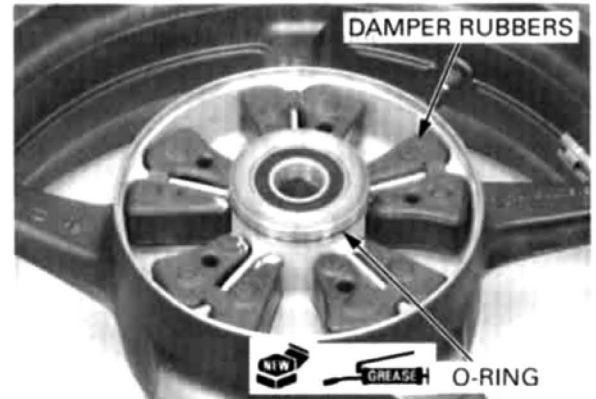
Install the driven flange collar in the new driven flange bearing until it is fully seated.

DRIVEN FLANGE COLLAR



DRIVEN FLANGE BEARING

Install the wheel damper rubbers into the wheel hub.
Apply grease to the new O-ring and install it into the groove of the wheel hub.

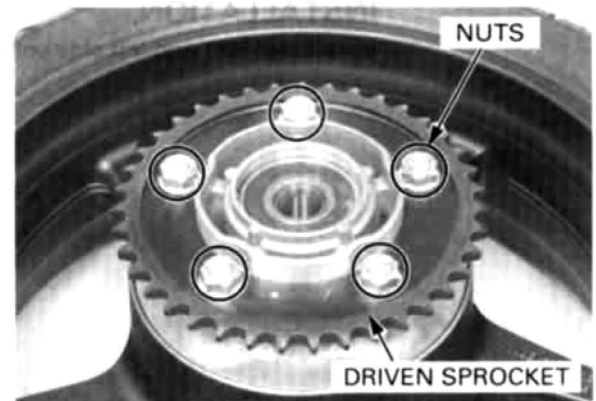


DAMPER RUBBERS

O-RING

Install the driven flange assembly into the left wheel hub.
If the driven sprocket was removed, install the driven sprocket and tighten the nuts.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

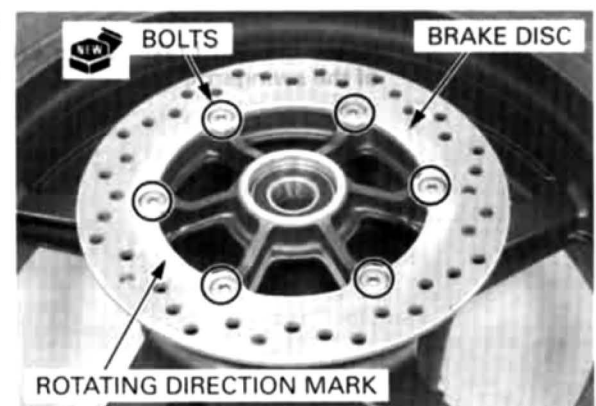


NUTS

DRIVEN SPROCKET

Install the brake disc with its rotating direction mark facing out.
Install and tighten the new bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



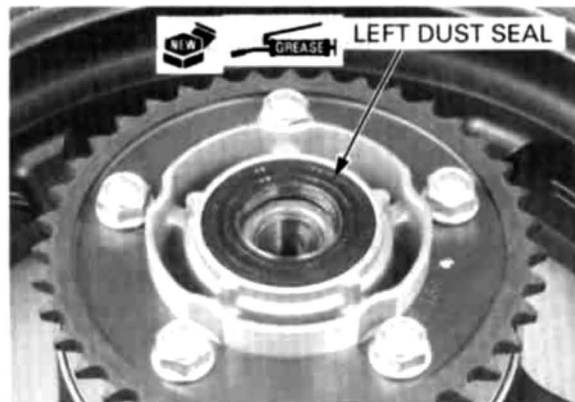
BOLTS

BRAKE DISC

ROTATING DIRECTION MARK

REAR WHEEL/SUSPENSION

Apply grease to the new left dust seal lips, install it into the driven flange.

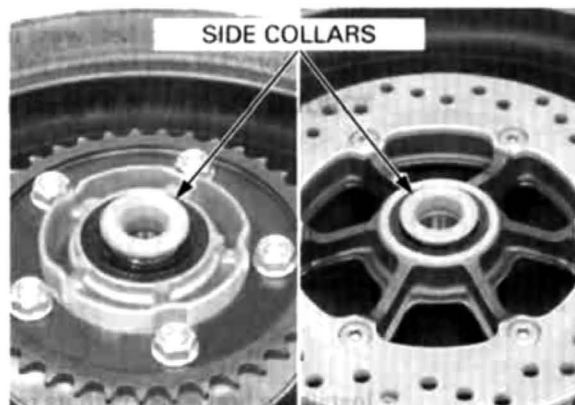


Apply grease to the new right dust seal lips, install it into the right wheel hub.

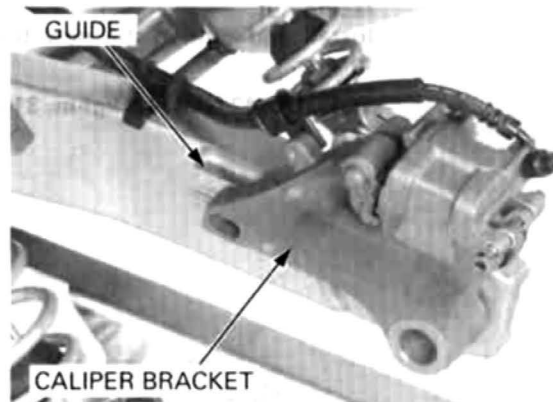


INSTALLATION

Install the right and left side collars.

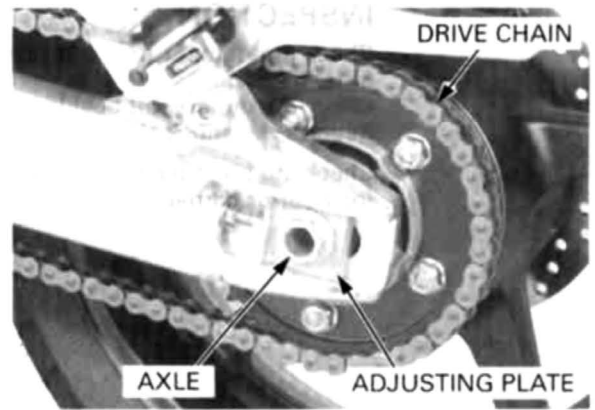


Install the rear brake caliper bracket onto the guide of the swingarm.



Be careful not to damage the brake pads.

Place the rear wheel into the swingarm.
Install the drive chain over the driven sprocket.
Install the left drive chain adjusting plate and rear axle from the left side.

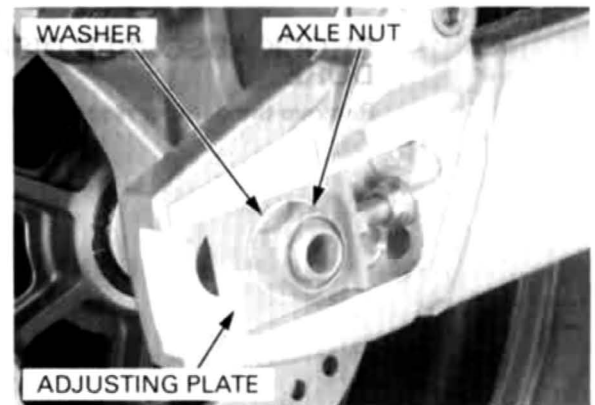


Install the right drive chain adjusting plate, washer and axle nut.

Adjust the drive chain slack (page 4-20).

Tighten the axle nut to the specified torque.

TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)

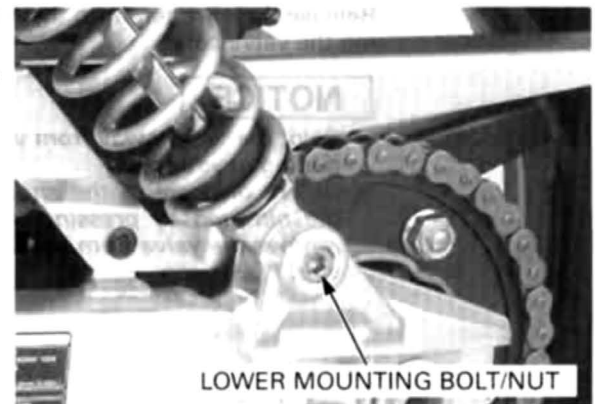


SHOCK ABSORBER

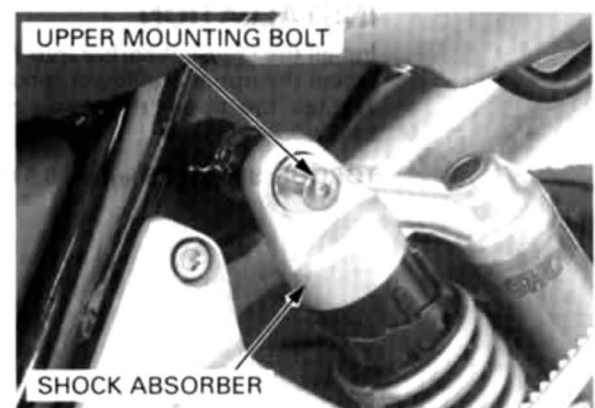
REMOVAL

Support the motorcycle using a safety stand or a hoist, raise the rear wheel off the ground.

Remove the shock absorber lower mounting bolt/nut.



Remove the shock absorber upper mounting bolt and the shock absorber.



INSPECTION

Check the damper unit and reservoir for leakage or other damage.

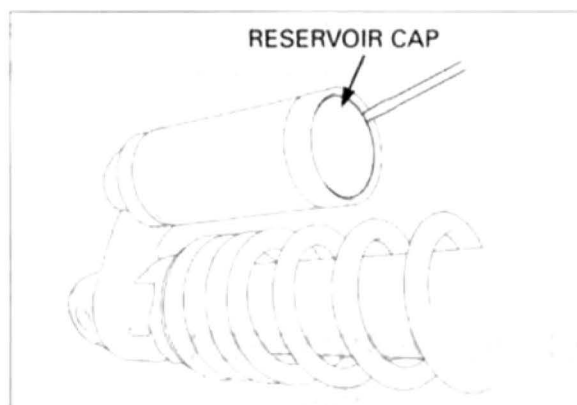
Check the upper joint bushing for wear or damage. Replace the shock absorber assembly if necessary.

Check the pivot bushing, pivot collar and dust seals for wear or damage.



SHOCK ABSORBER DISPOSAL PROCEDURE

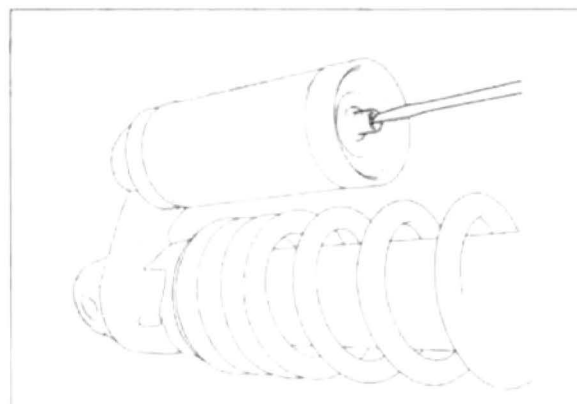
Remove the damper reservoir cap.



Release the nitrogen from the reservoir by depressing the valve core.

NOTICE

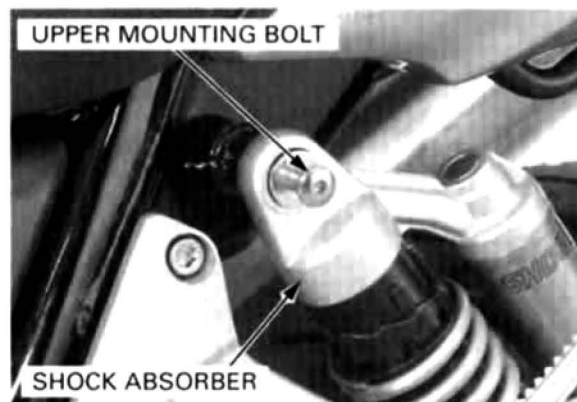
- Point the valve away from you to prevent debris getting in your eyes.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.



INSTALLATION

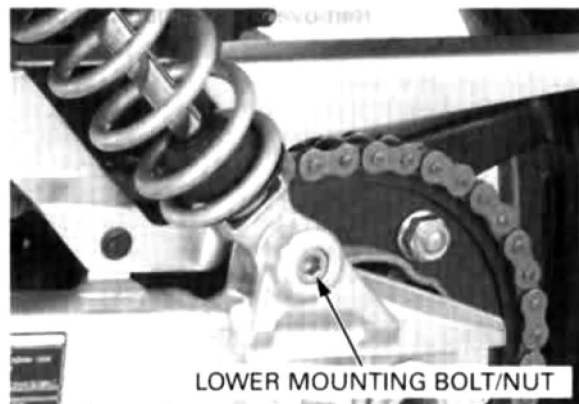
Install the shock absorber into the frame. Install the upper and lower mounting bolt/nut. Tighten the upper mounting bolt to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



Tighten the lower mounting nut to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

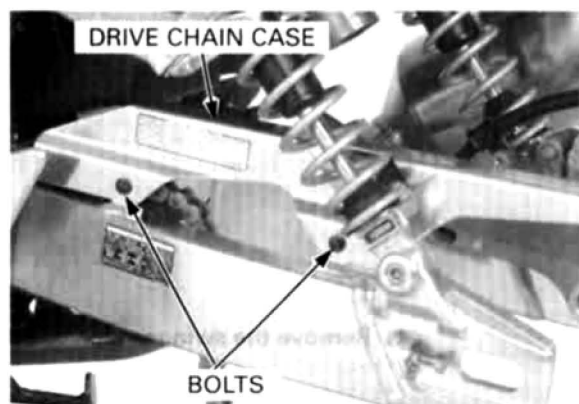


SWINGARM

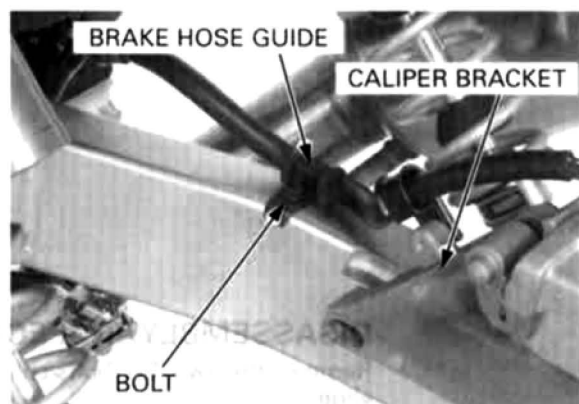
REMOVAL

Remove the rear wheel (page 14-6).

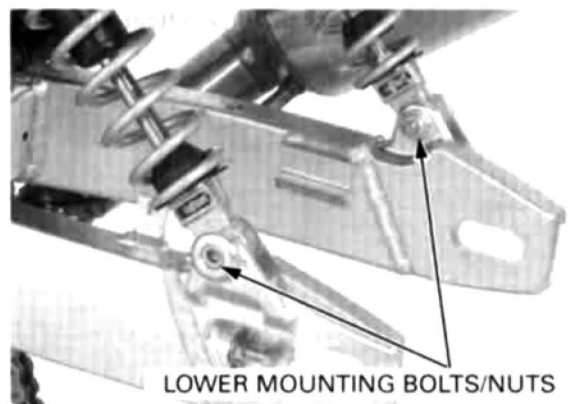
Remove the bolts and drive chain case.



Remove the brake hose clamp bolt, then remove the caliper bracket from the swingarm.

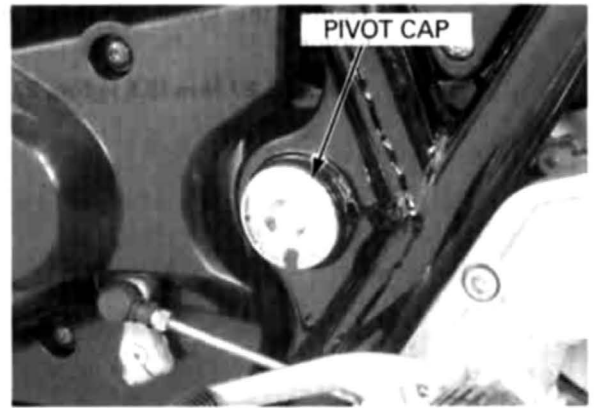


Remove the rear shock absorber lower mounting bolts and nuts.

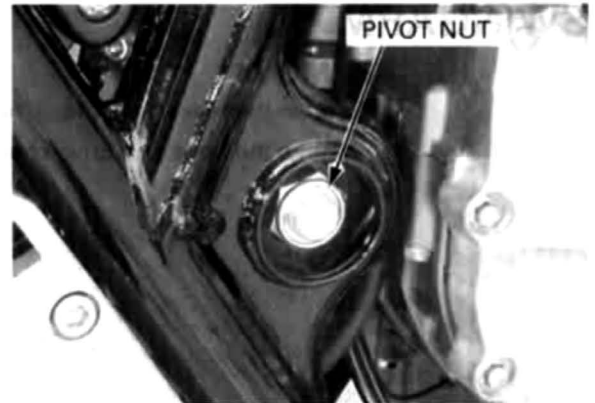


REAR WHEEL/SUSPENSION

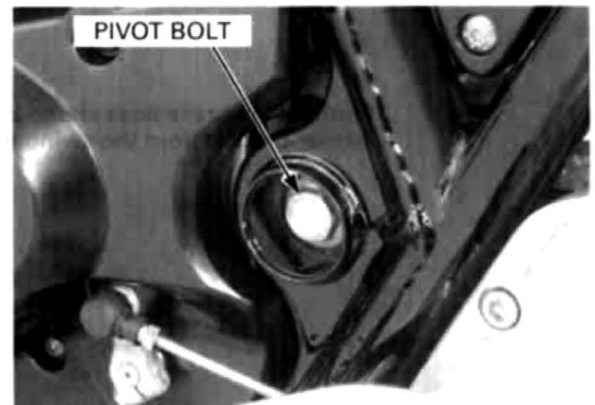
Remove the swingarm pivot bolt caps.



Remove the swingarm pivot nut.



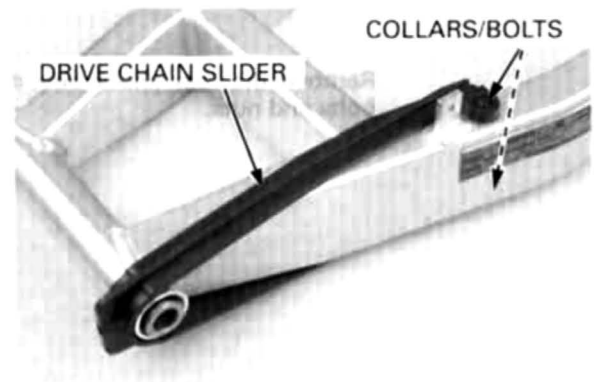
Remove the swingarm pivot bolt and swingarm.



DISASSEMBLY/INSPECTION

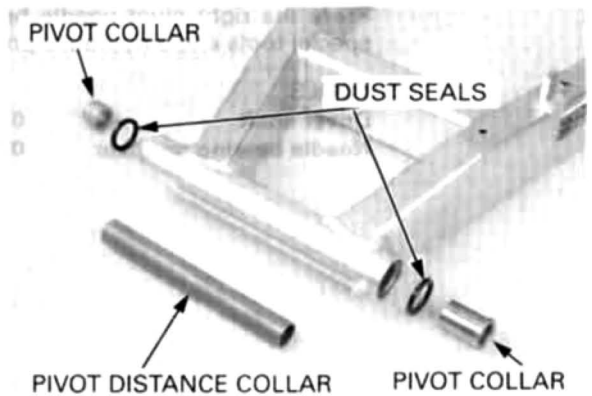
Remove the two SH bolts/collars and drive chain slider.

Check the drive chain slider for wear or damage.



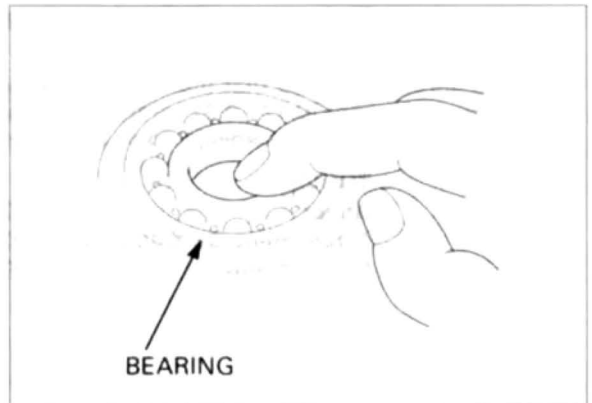
Remove the pivot collars and dust seals from the swingarm pivot.
Remove the pivot distance collar.

Check the dust seals and collars for damage or fatigue.



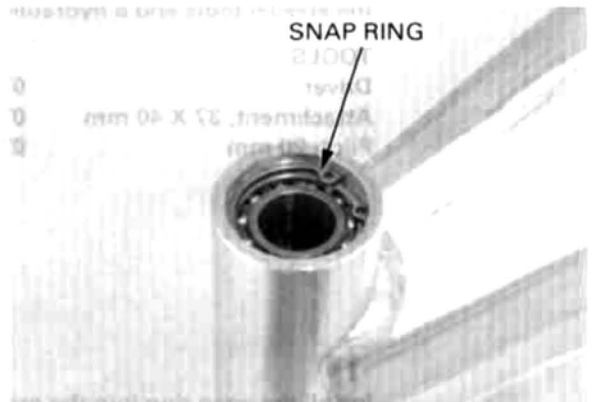
Turn the inner race of right pivot bearings with your finger.
The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



PIVOT BEARING REPLACEMENT

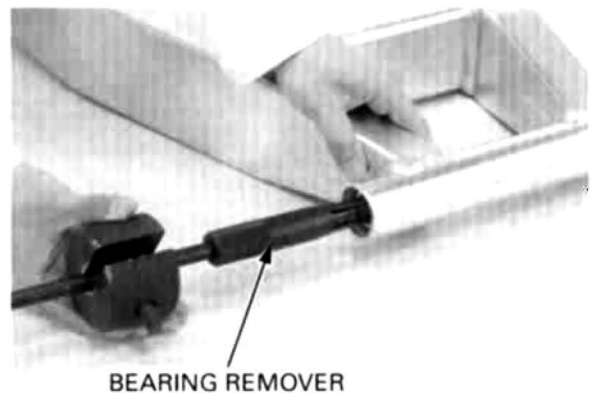
Remove the snap ring.



Remove the right pivot radial ball bearings using the special tools.

TOOLS:

Bearing remover handle	07936-3710100
Bearing remover head	07936-3710600
Remover weight	07741-0010201

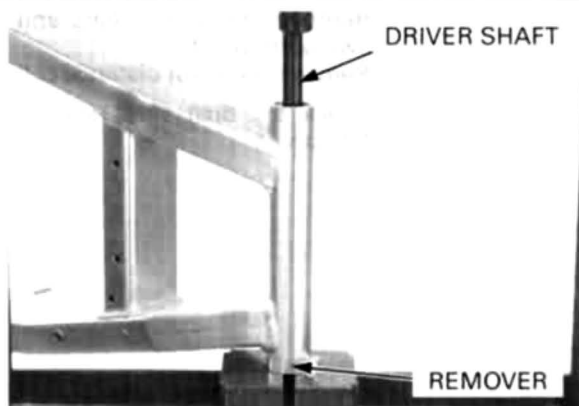


REAR WHEEL/SUSPENSION

Press the right pivot needle bearing out using the special tools and a hydraulic press.

TOOLS:

Driver shaft	07946-MJ00100
Needle bearing remover	07HMC-MR70100



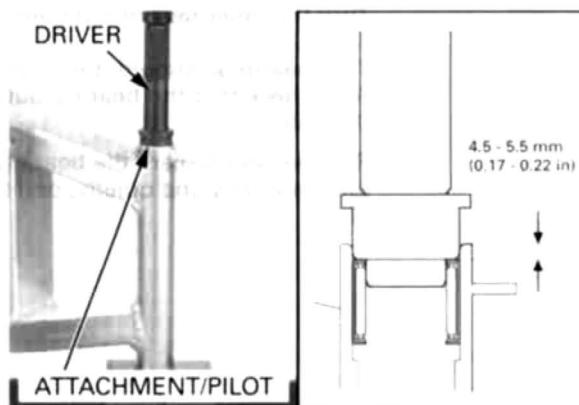
Pack new needle bearing with grease.

Press the needle bearing into the swingarm pivot with the marked side facing out

Press the needle bearing into the swingarm right pivot so that the needle bearing surface is 4.5 - 5.5 mm (0.17 - 0.22 in) from the end of swingarm pivot using the special tools and a hydraulic press.

TOOLS:

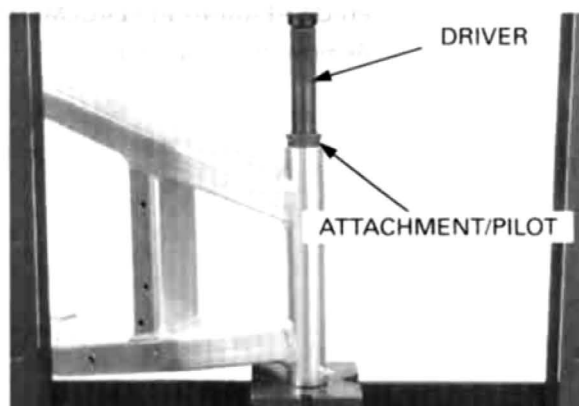
Driver	07749-0010000
Attachment, 37 X 40 mm	07746-0010200
Pilot, 28 mm	07746-0041100



Press the radial ball bearings in until it seats using the special tools and a hydraulic press.

TOOLS:

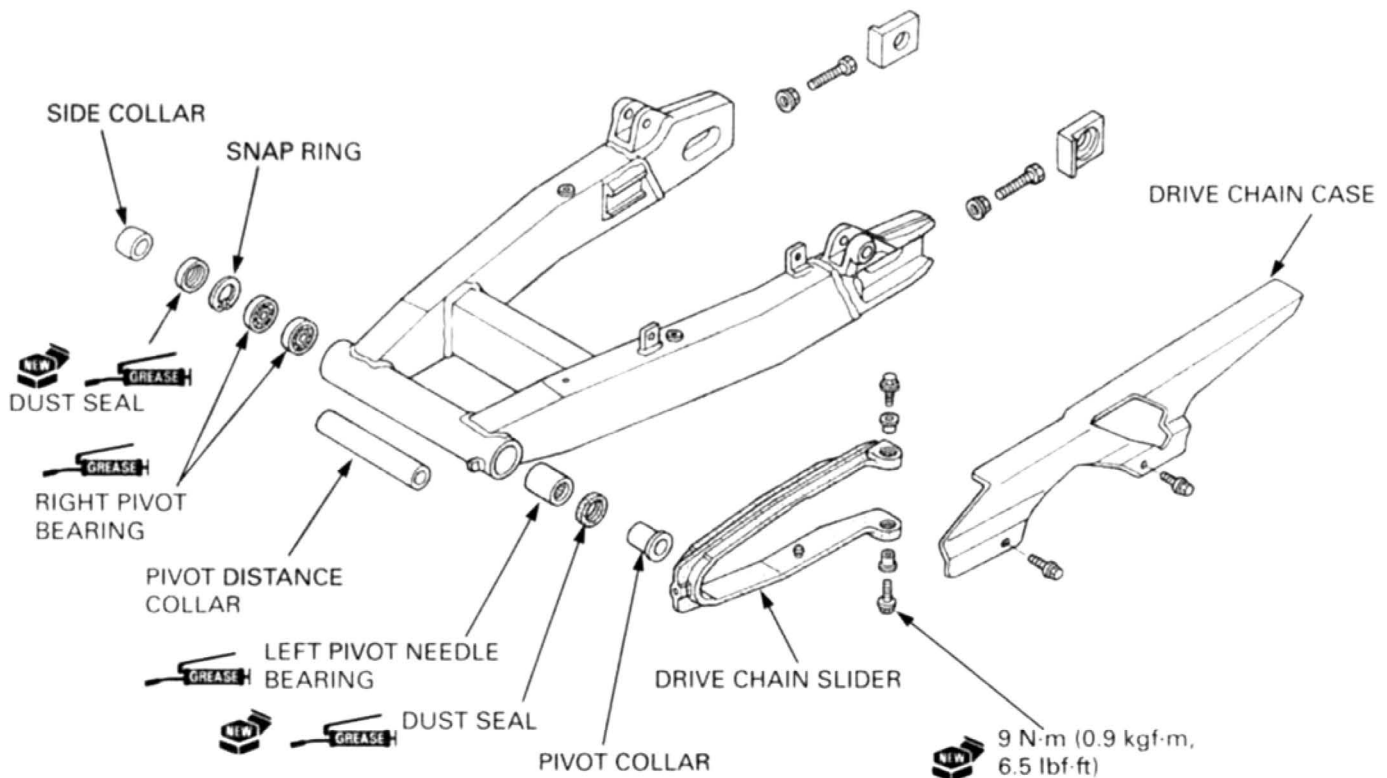
Driver	07749-0010000
Attachment, 37 X 40 mm	07746-0010200
Pilot, 20 mm	07746-0040500



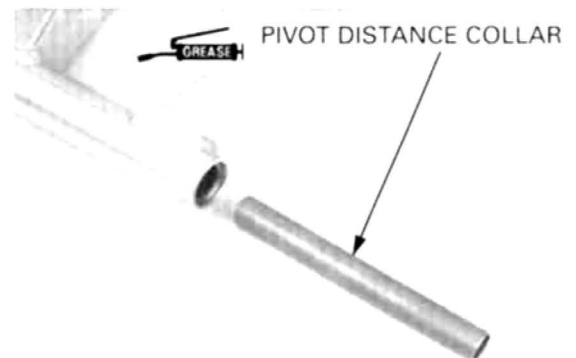
Install the snap ring into the groove securely.



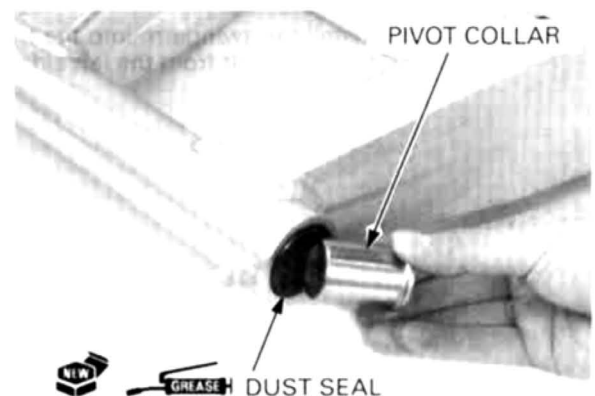
ASSEMBLY



Apply grease the pivot distance collar and install it into the swingarm pivot.



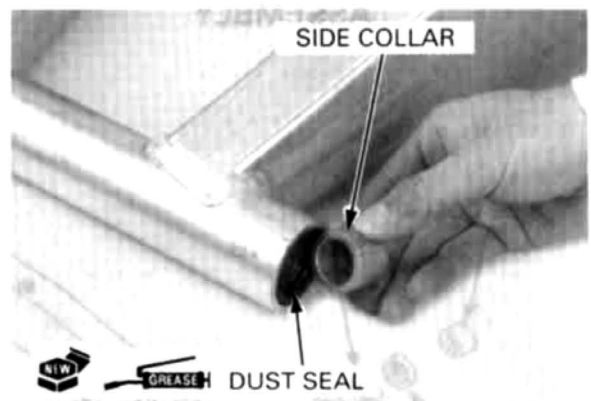
Pack the needle bearing with grease.
Apply grease to the new dust seal lip, then install it into the left swingarm pivot.
Install the pivot collar.



REAR WHEEL/SUSPENSION

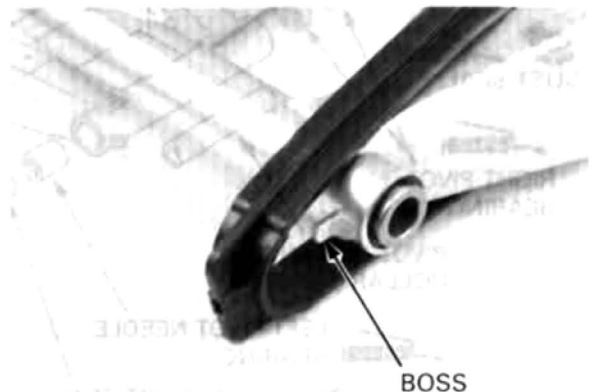
Apply grease to the new dust seal lip, then install it into the right swingarm pivot.

Install the right side collar.



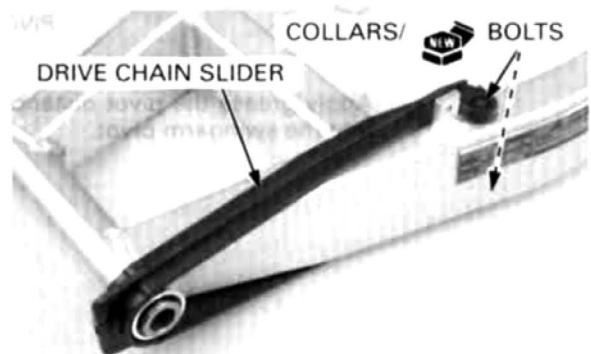
Install the drive chain slider aligning the slit with the boss on the swingarm.

Install the drive chain slider bosses into the hole in the swingarm.



Install and tighten the new drive chain slider mounting bolts to the specified torque.

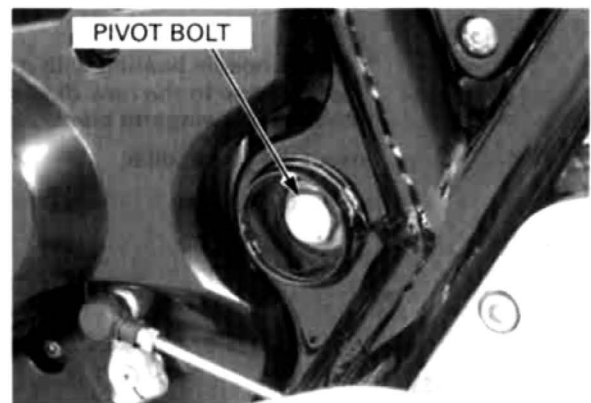
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



INSTALLATION

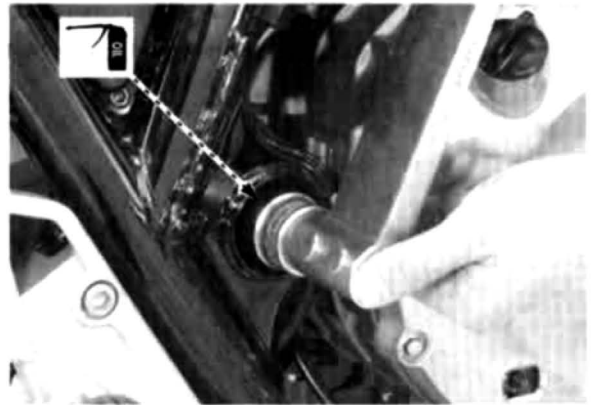
Apply thin layer of grease to the swingarm pivot bolt outer surface.

Install the swingarm into the frame, and then install the pivot bolt from the left side.

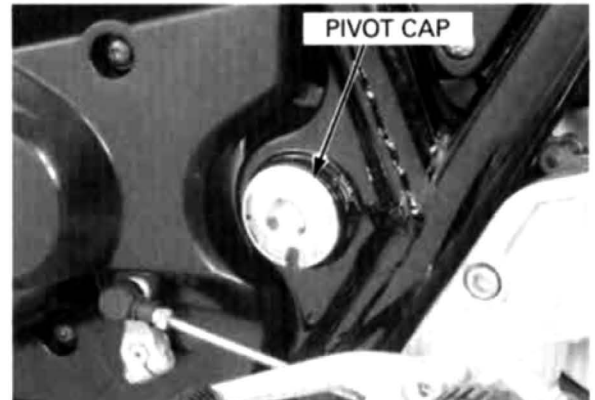


Apply oil to the swingarm pivot nut threads and seating surface.
Install and tighten the swingarm pivot nut to the specified torque.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

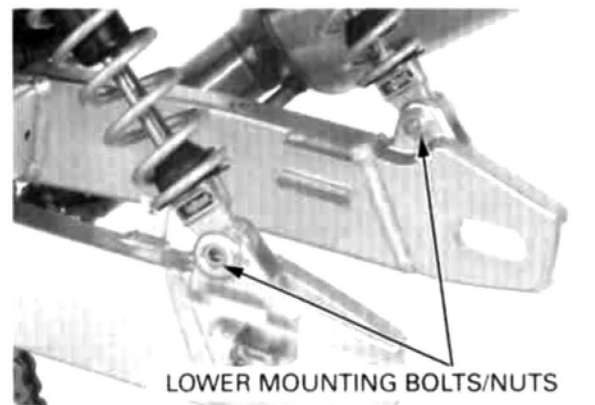


Install the swingarm pivot caps.



Install the rear shock absorbers onto the swingarm.
Install and tighten the shock absorber lower mounting bolt/nut to the specified torque.

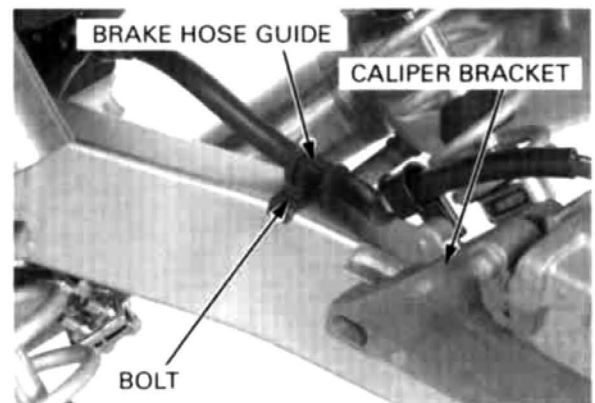
TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



Route the brake hose properly, then install the rear brake caliper/bracket onto the boss of the swingarm.

Install the brake hose clamp onto the swingarm and tighten the bolt to the specified torque.

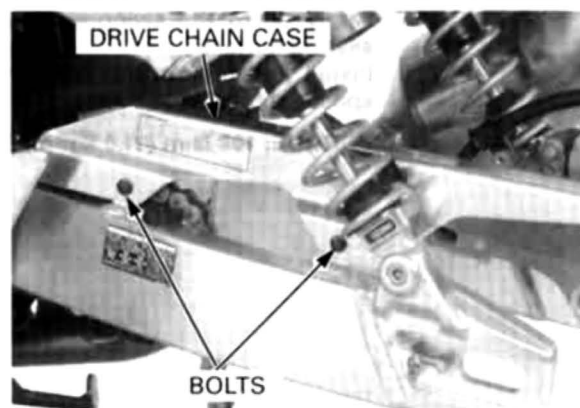
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



REAR WHEEL/SUSPENSION

Install the drive chain case and tighten the bolts.

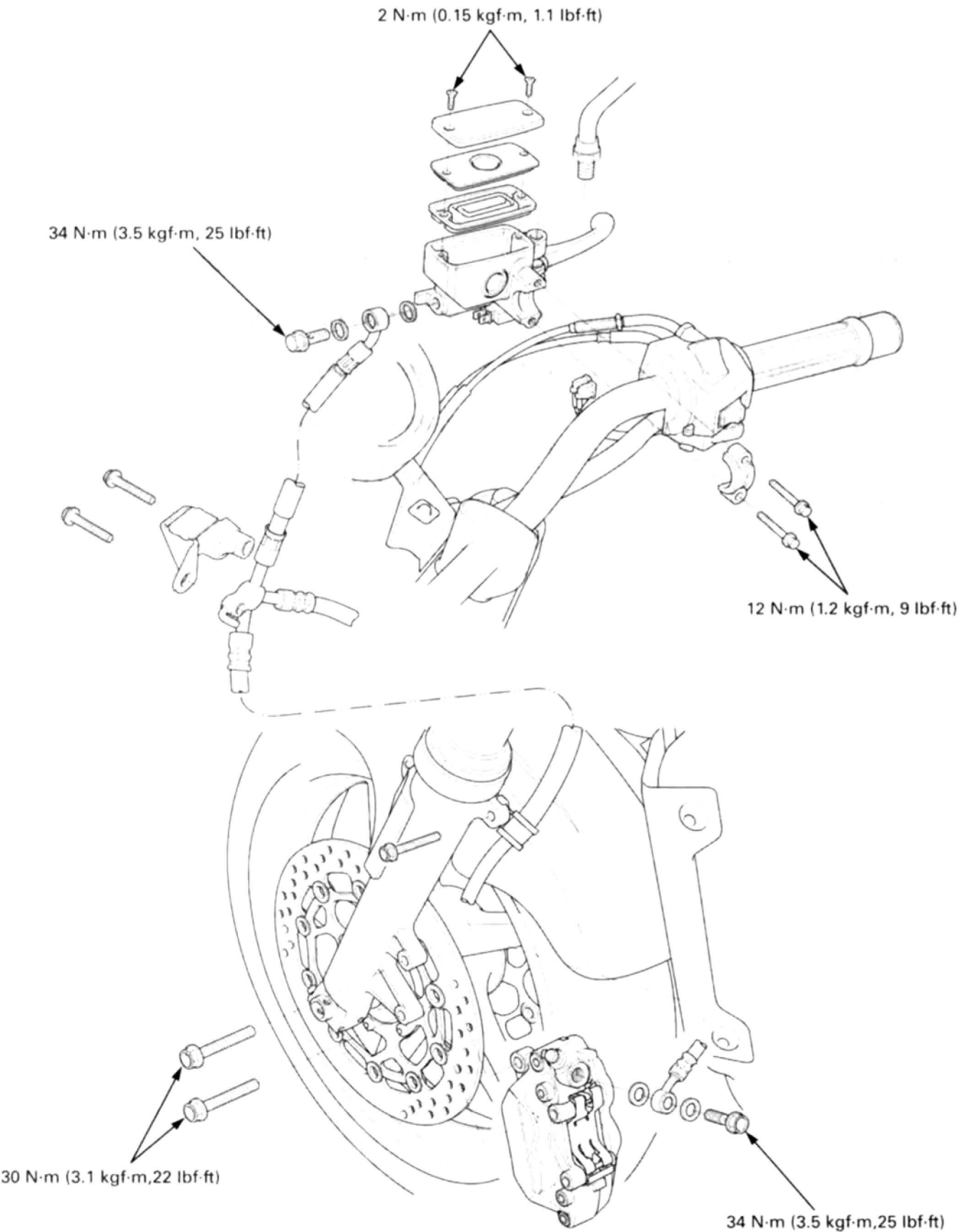
Install the rear wheel (page 14-12).



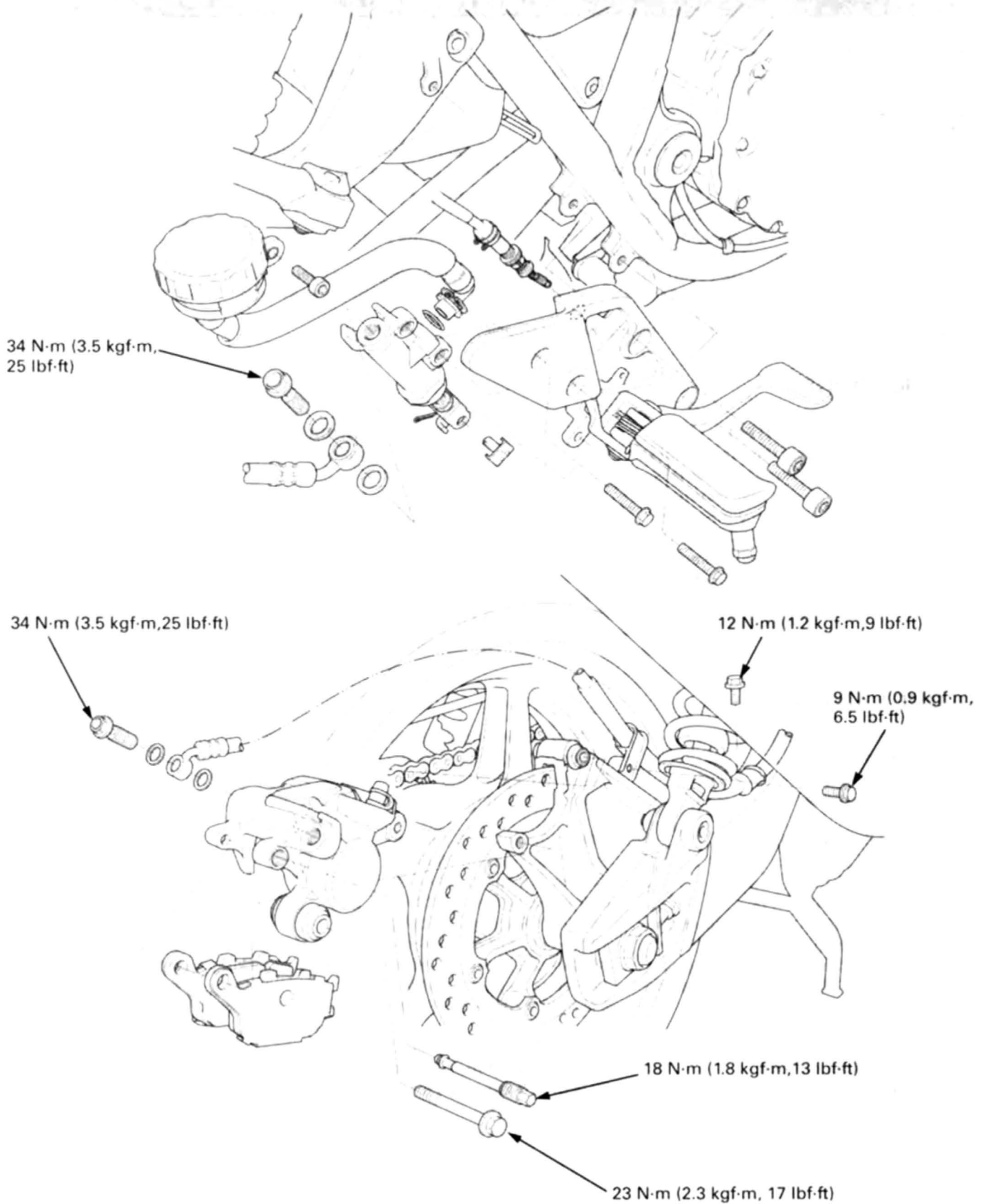
COMPONENT LOCATION	15-2	FRONT MASTER CYLINDER.....	15-13
SERVICE INFORMATION	15-4	REAR MASTER CYLINDER	15-17
TROUBLESHOOTING	15-5	FRONT BRAKE CALIPER	15-23
BRAKE FLUID REPLACEMENT/AIR BLEEDING	15-6	REAR BRAKE CALIPER.....	15-26
BRAKE PAD/DISC.....	15-9	BRAKE PEDAL	15-29

COMPONENT LOCATION

FRONT:



REAR:



SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use and OSHA-approved vacuum cleaner.

NOTICE

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake lever or pedal after the air bleeding.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

		Unit: mm (in)	
	ITEM	STANDARD	SERVICE LIMIT
Front	Specified brake fluid	Honda DOT 4 brake fluid	—
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout	—	0.20 (0.008)
	Master cylinder I.D.	14.0 (0.55)	—
	Caliper cylinder I.D.	30.2 (1.19)	—
Rear	Specified brake fluid	Honda DOT 4 brake fluid	—
	Brake disk thickness	6.0 (0.24)	5.0 (0.20)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	14.0 (0.55)	—
	Caliper cylinder I.D.	38.1 (1.50)	—

TOEQUE VALUES

Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt
Brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front master cylinder reservoir cap screw	2 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Front brake light switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake caliper bleeder valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Rear master cylinder push rod joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper assembly torx bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Rear brake hose clamp bolt (swingarm)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear brake hose clamp bolt (caliper bracket)	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Rear brake caliper bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply a locking agent to the threads
Drive footpeg bracket socket bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	

TOOLS

Snap ring pliers
07914-SA50001



TROUBLESHOOTING

Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly (rear)
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags

- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly (rear)
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTICE

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

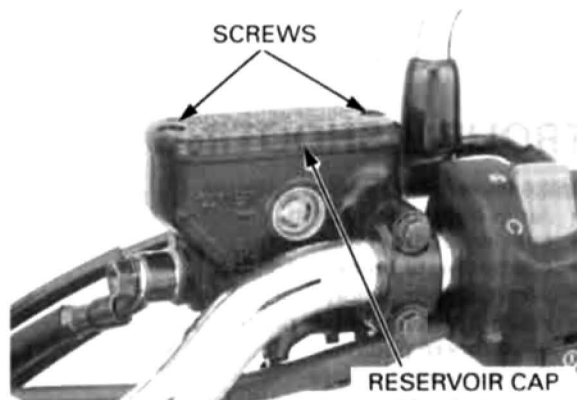
BRAKE FLUID DRAINING

FRONT:

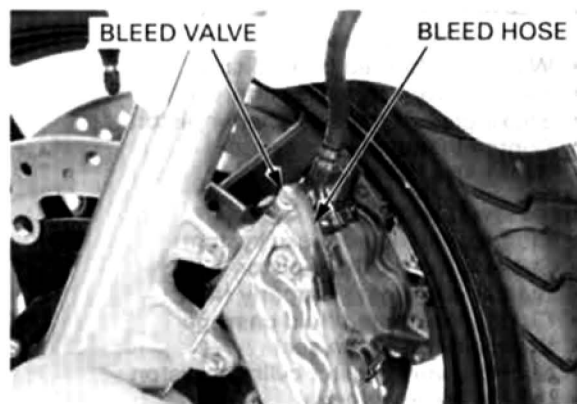
Support the motorcycle securely using a hoist or equivalent.

Turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

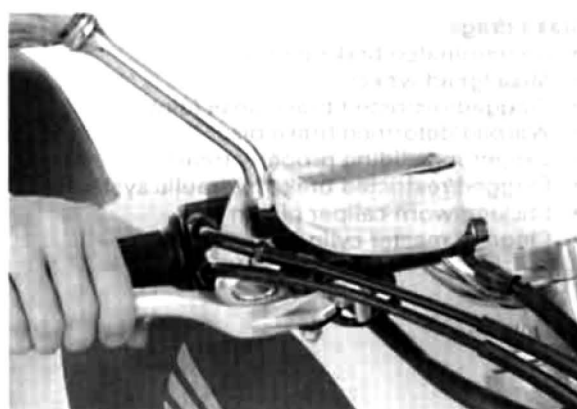
Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the caliper bleed valve.



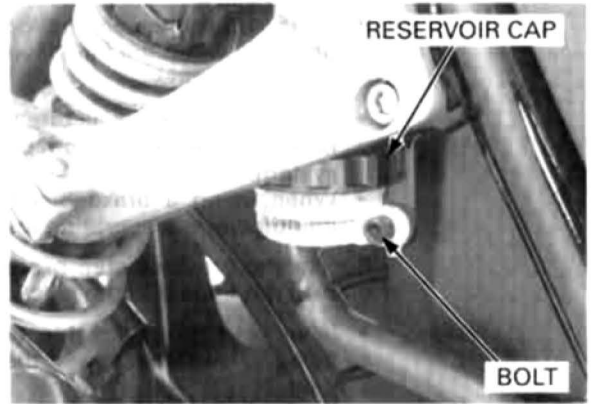
Loosen the bleed valve and pump the brake lever. Stop pumping the lever or pedal when no more fluid flows out of the bleed valve.



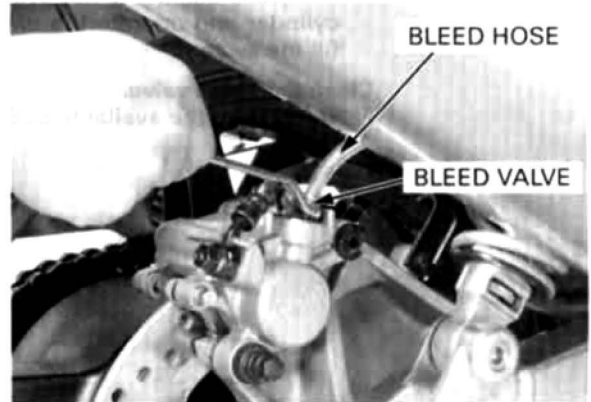
REAR:

Remove the reservoir from the air cleaner housing by removing the bolt.

Remove the reservoir cap, diaphragm plate and diaphragm.



Connect a bleed hose to the caliper bleed valve.



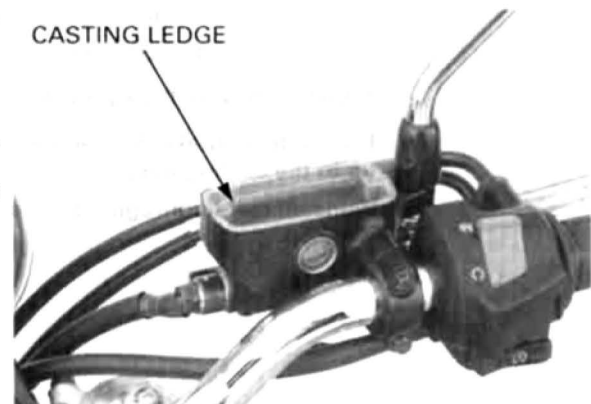
Loosen the bleed valve and pump the brake pedal. Stop pumping the pedal when no more fluid flows out of the bleed valve.

**BRAKE FLUID FILLING**

Fill the reservoir with DOT 4 brake fluid from a sealed container.

NOTICE

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. There are not compatible.



HYDRAULIC BRAKE

Connect a commercially available brake bleeder to the bleed valve. Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

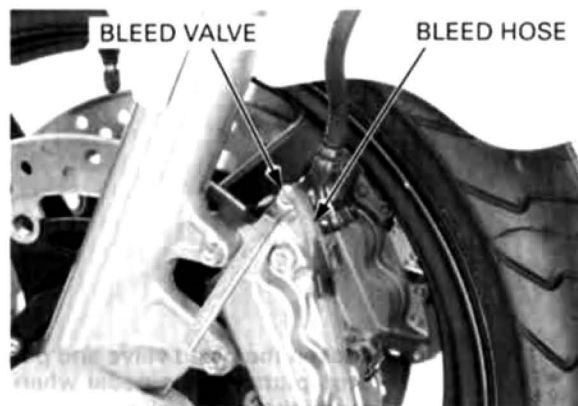
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the previous step procedures until air bubbles do not appear in the plastic hose.

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
- If a brake bleeder is not available, fill the master cylinder and operate the brake lever or pedal to fill the system.

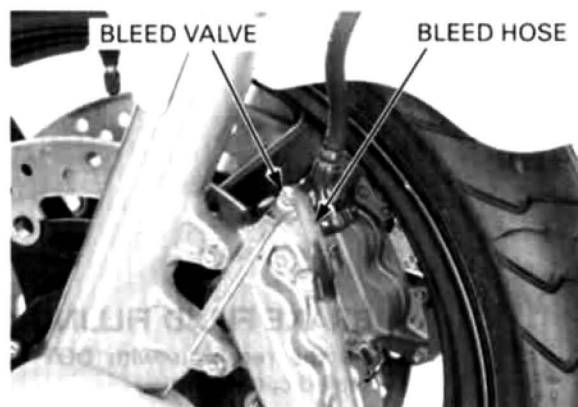
Close the bleed valve.

Next, perform the available BLEEDING procedure.



AIR BLEEDING

Connect a clear bleed hose to the bleed valve. Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the master cylinder and lever or pedal resistance is felt.



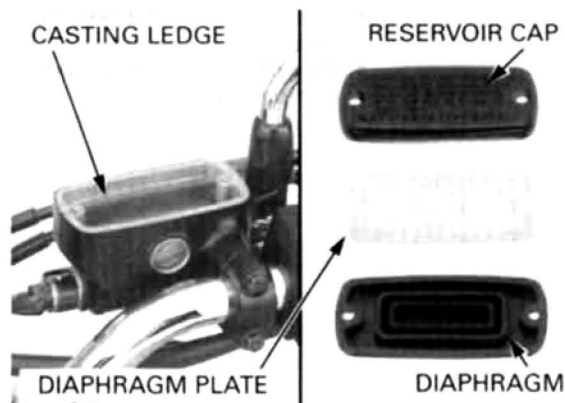
Do not release the brake lever or pedal until the bleed valve has been closed.

1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the valve.
2. Release the brake lever or pedal until the bleed valve has been closed.
3. Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.
4. Tighten the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

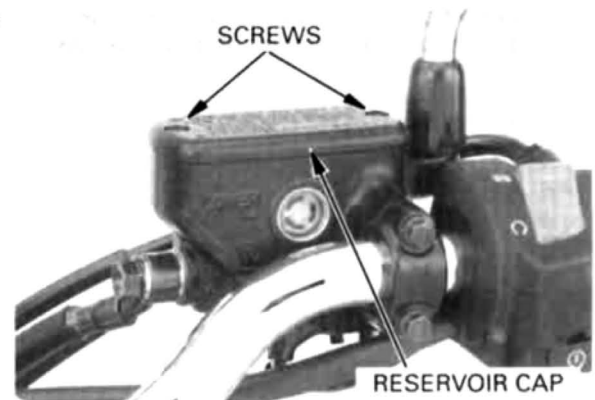
For the front brake, fill the master cylinder reservoir up to the casting ledge.

Reinstall the diaphragm, diaphragm plate and reservoir cap.



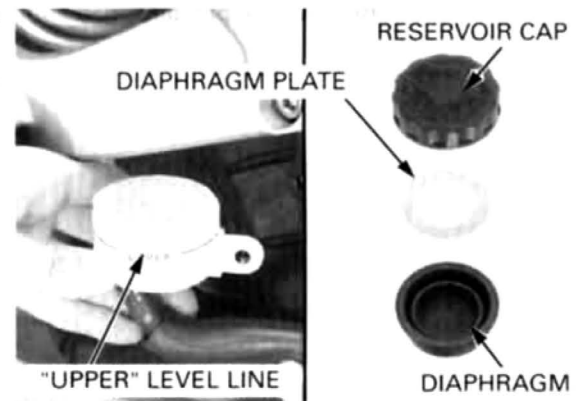
Install and tighten the reservoir cap screws to the specified torque.

TORQUE: 2 N·m (0.15 kgf·m, 1.1 lbf·ft)



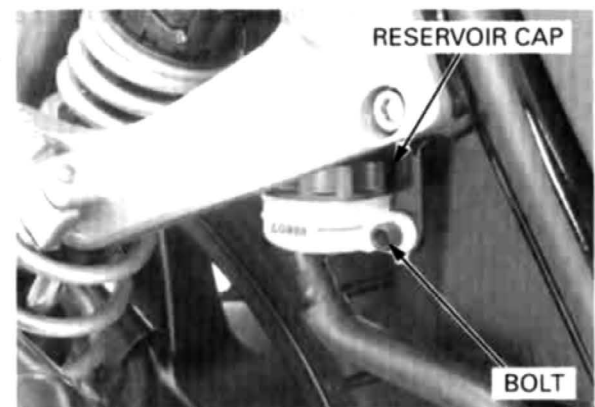
For the rear brake, fill the reservoir tank up to the "UPPER" level line.

Reinstall the diaphragm, diaphragm plate and reservoir cap.



Tighten the reservoir cap securely.

Install the brake reservoir onto the air cleaner housing and tighten the bolt.

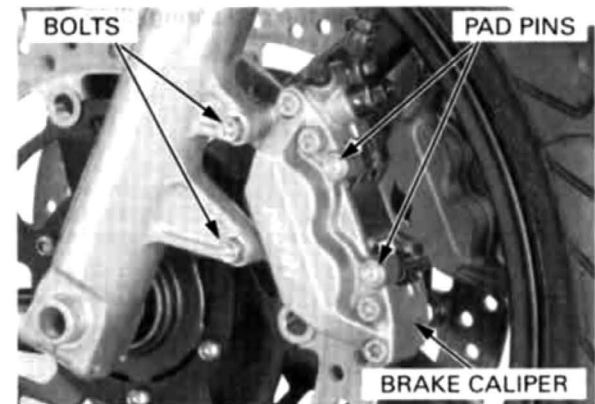


BRAKE PAD/DISC

Always replace the brake pads in pairs to assure even disc pressure.

FRONT BRAKE PAD REPLACEMENT

Loosen the pad pins.
Remove the bolts and brake caliper.



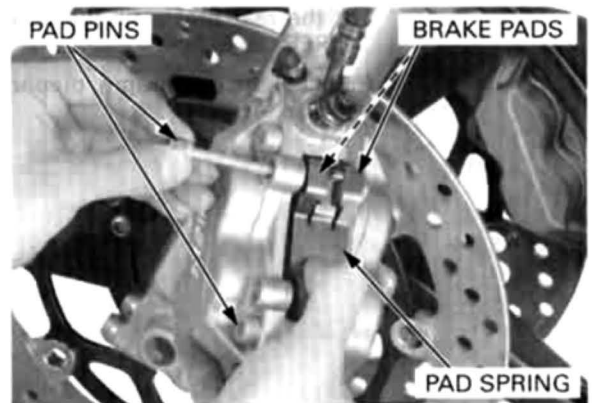
HYDRAULIC BRAKE

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

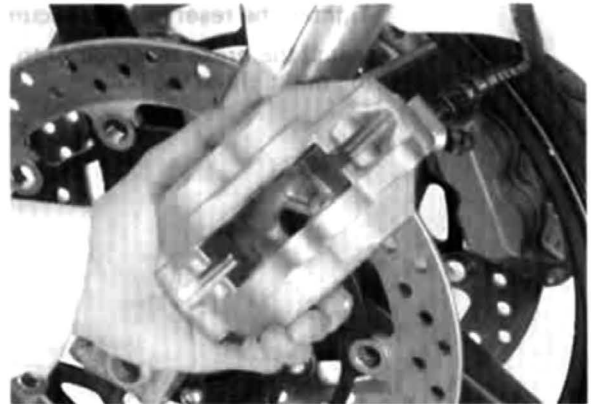
Push the caliper pistons all the way in to allow installation of new brake pads.



Remove the pad pins, pad spring and brake pads.

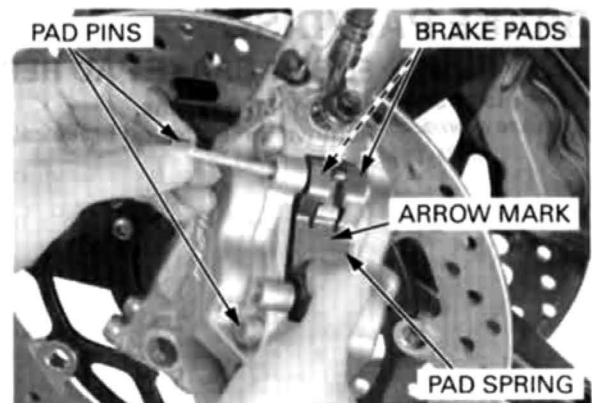


Clean the inside of the caliper especially around the caliper pistons.



Install the new brake pads.
Install the pad spring with its arrow mark facing up as shown.

Push the pad spring, then install the pad pin.



Be careful not to damage the pads.

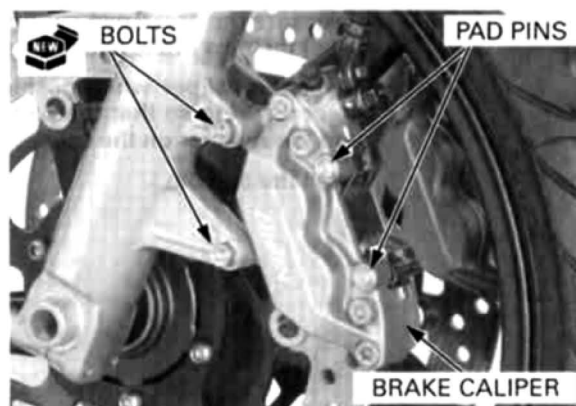
Install the brake caliper to the fork leg so that the disc is positioned between the pads.

Install and tighten the new brake caliper mounting bolts.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Tighten the pad pins.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Always replace the brake pads in pairs to assure even disc pressure.

REAR BRAKE PAD REPLACEMENT

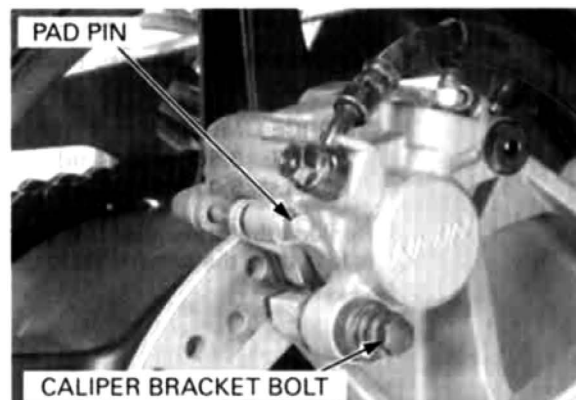
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.



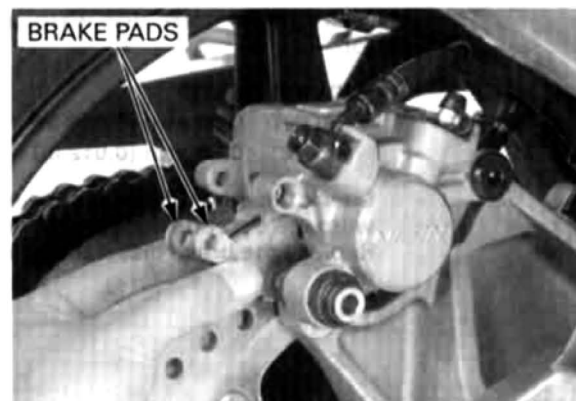
Loosen the pad pin.

Remove the caliper bracket bolt.



Pivot the caliper up.

Remove the pad pin and brake pads.

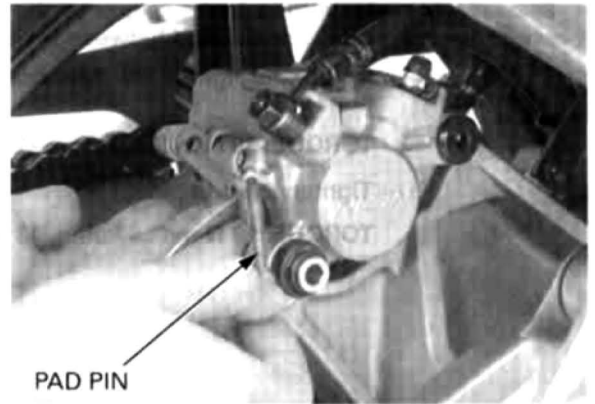


HYDRAULIC BRAKE

Make sure the brake pad spring is in place.
Install the new brake pads.

Lower the caliper while pushing the pads against the pad spring so that the pad ends are positioned onto the retainer on the caliper bracket.

Install the pad pin.

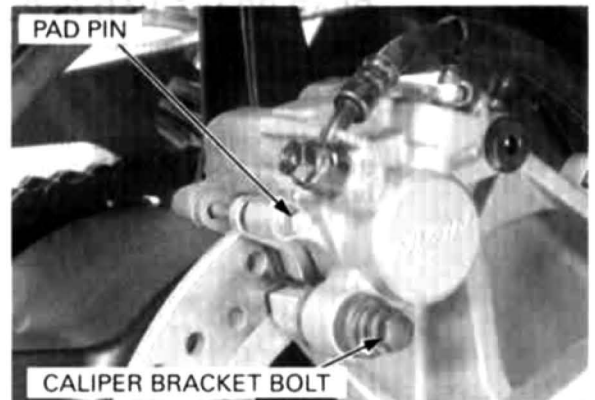


Install and tighten the caliper bracket bolt.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or crack.

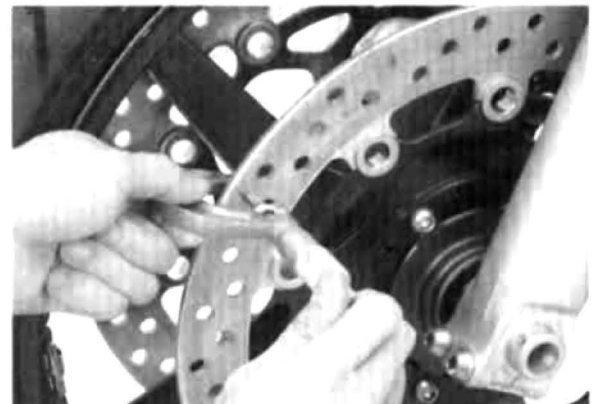
Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:

FRONT: 3.5 mm (0.14 in)

REAR: 5.0 mm (0.20 in)

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warp with a dial indicator.

SERVICE LIMITS:

FRONT: 0.20 mm (0.008 in)

REAR: 0.30 mm (0.012 in)

Check the wheel bearings for excessive play, if the warp exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



FRONT MASTER CYLINDER

REMOVAL

Drain the front hydraulic system (page 15-6).

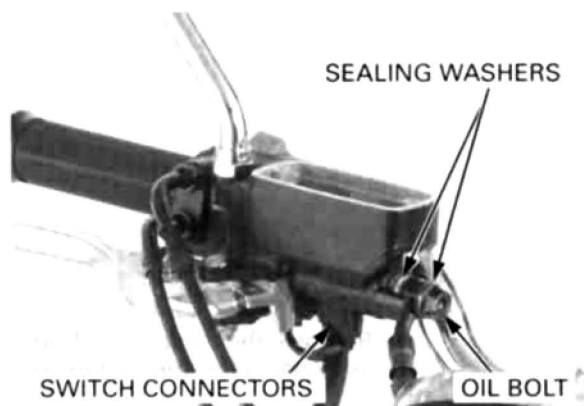
Remove the rearview mirror.

Disconnect the brake light switch wire connectors.

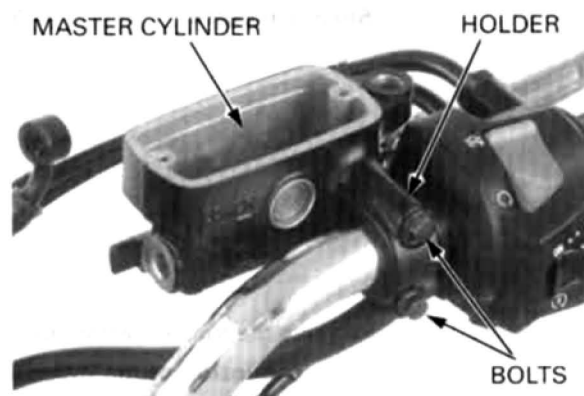
Avoid spilling fluid on painted, plastic, or rubber parts.

Place a rag over these parts whenever the system is serviced.

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

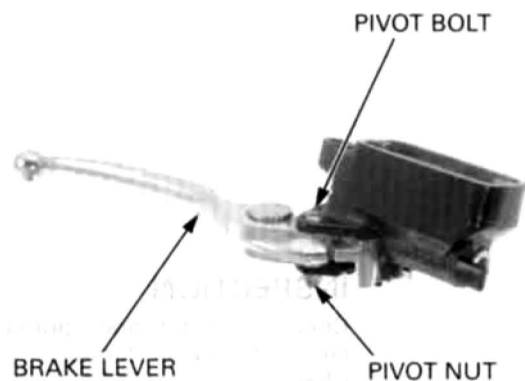


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

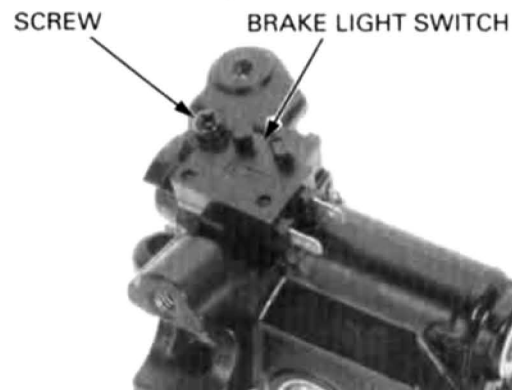


DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.

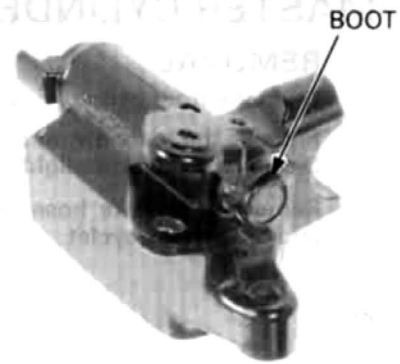


Remove the screw and brake light switch.



HYDRAULIC BRAKE

Remove the boot.

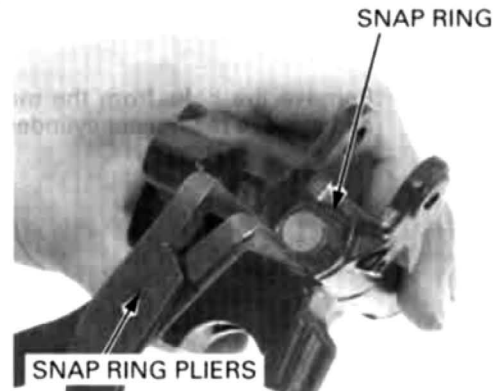


Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

Snap ring pliers

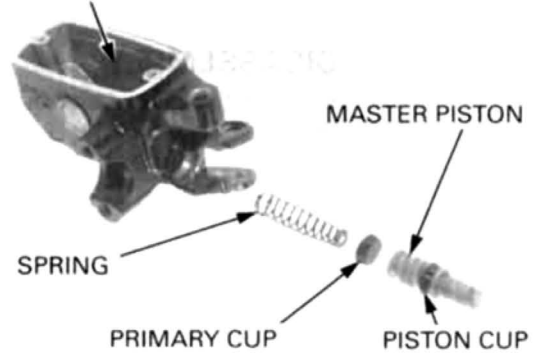
07914-SA50000



Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

MASTER CYLINDER

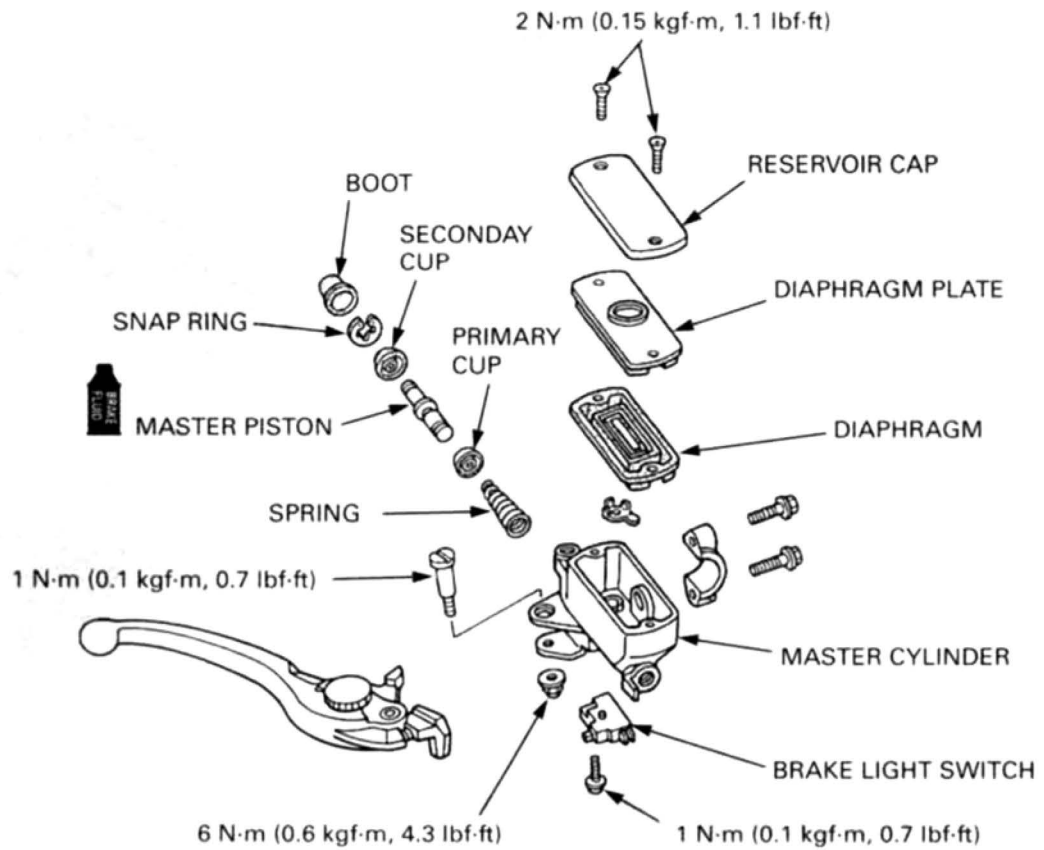


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

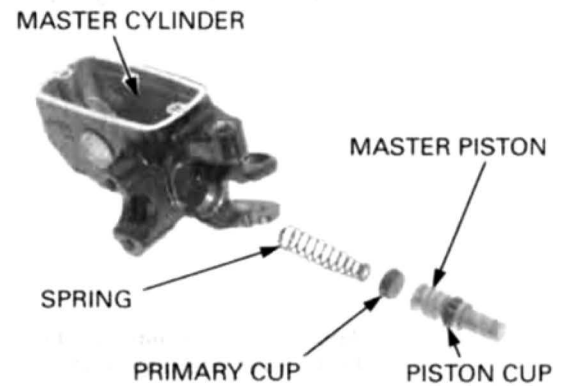


ASSEMBLY



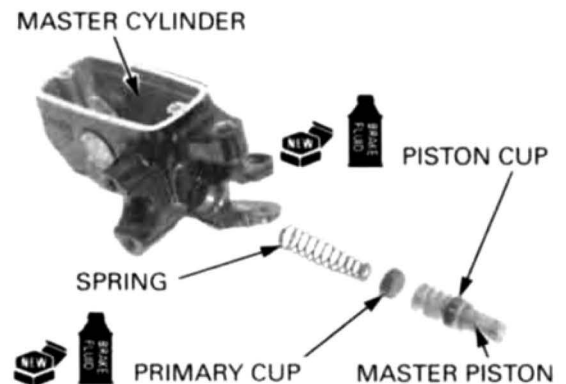
Keep the piston, cups, spring, snap ring and boot as a set, do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.



When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid.
Install the spring into the piston.
Install the piston assembly into the master cylinder.



HYDRAULIC BRAKE

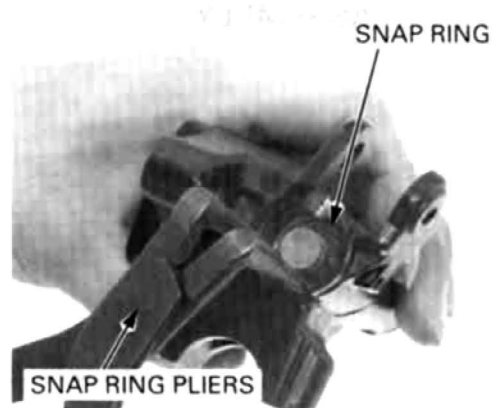
Be certain the snap ring is firmly seated in the groove

Install the snap ring.

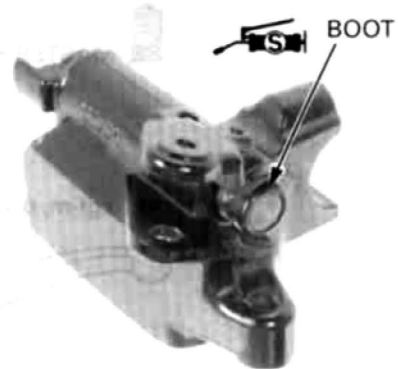
TOOL:

Snap ring pliers

07914-SA50000

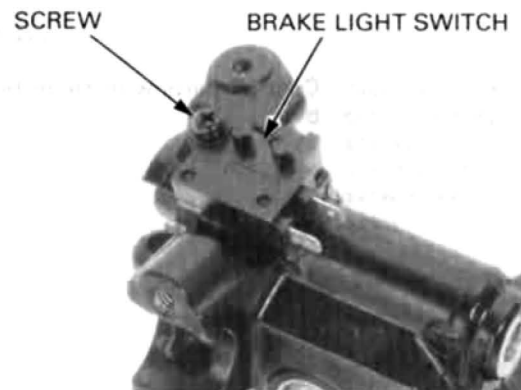


Install the boot.



Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Apply silicone grease to the contact surfaces of the brake lever and piston tip.



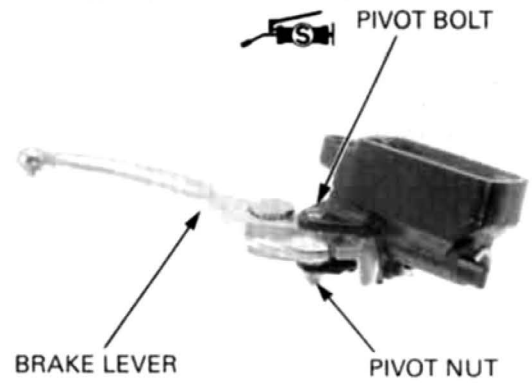
Apply silicone grease to the brake lever pivot sliding surface.

Install the brake lever assembly, tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



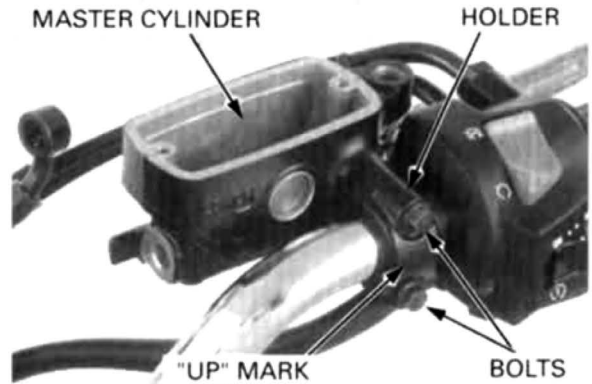
Place the master cylinder assembly on the handlebar.

Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



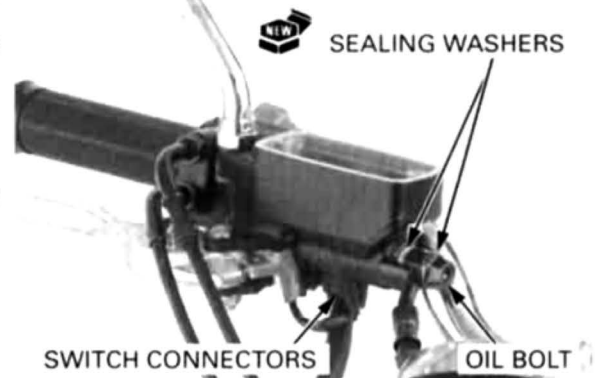
Install the brake hose eyelet with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch wire connectors.

Fill the reservoir to the upper level (page 15-7) and bleed the brake system (page 15-8).

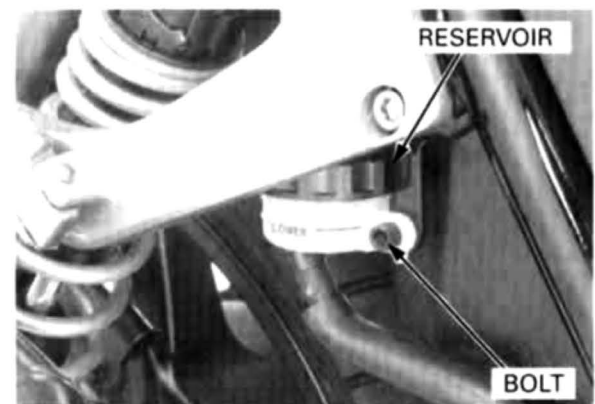


REAR MASTER CYLINDER

REMOVAL

Drain the rear hydraulic system (page 15-6).

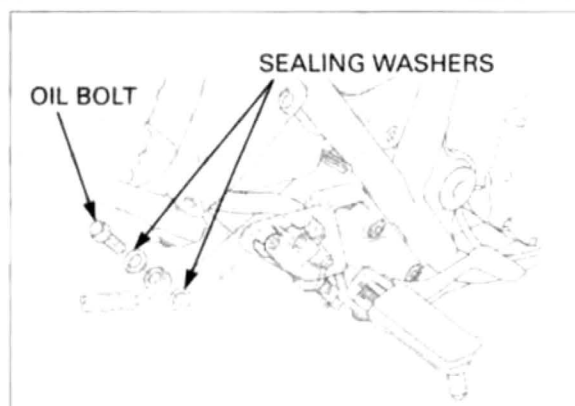
Remove the rear brake reservoir mounting bolt.



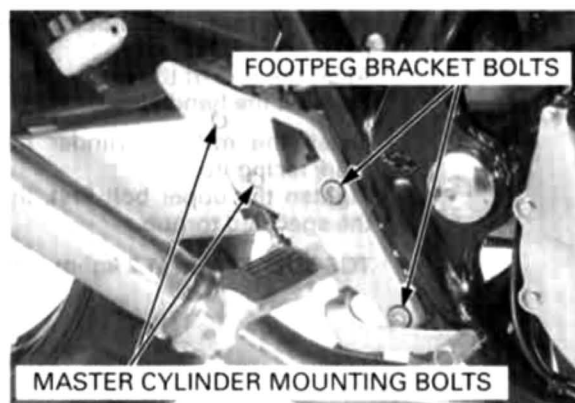
HYDRAULIC BRAKE

Avoid spilling fluid on painted, plastic, or rubber parts.
Place a rag over these parts whenever the system is serviced.

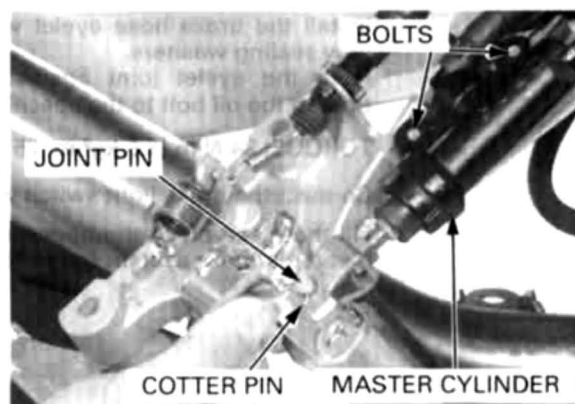
Remove the brake hose oil bolt, sealing washers and brake hose.



Loosen the rear master cylinder mounting bolts.
Remove the right footpeg bracket mounting bolts.

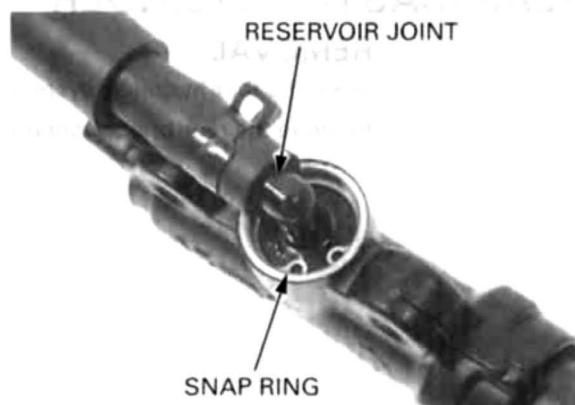


Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.



DISASSEMBLY

Remove the snap ring and reservoir hose joint from the master cylinder.
Remove the O-ring.



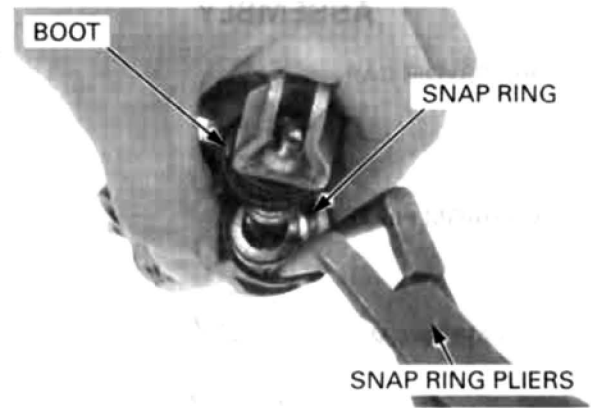
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

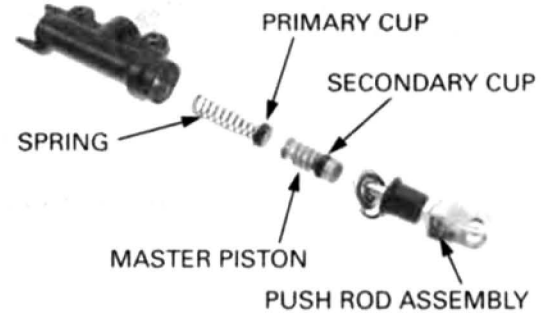
Snap ring pliers

07914-SA50000



Remove the push rod, master piston, primary cup and spring.

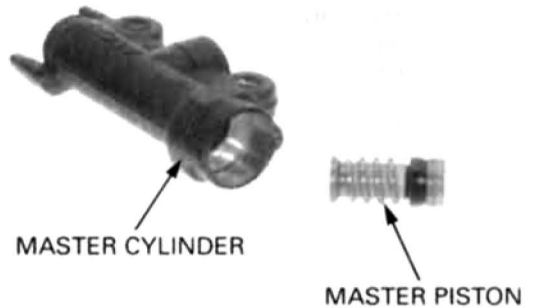
Clean the inside of the cylinder with brake fluid.



INSPECTION

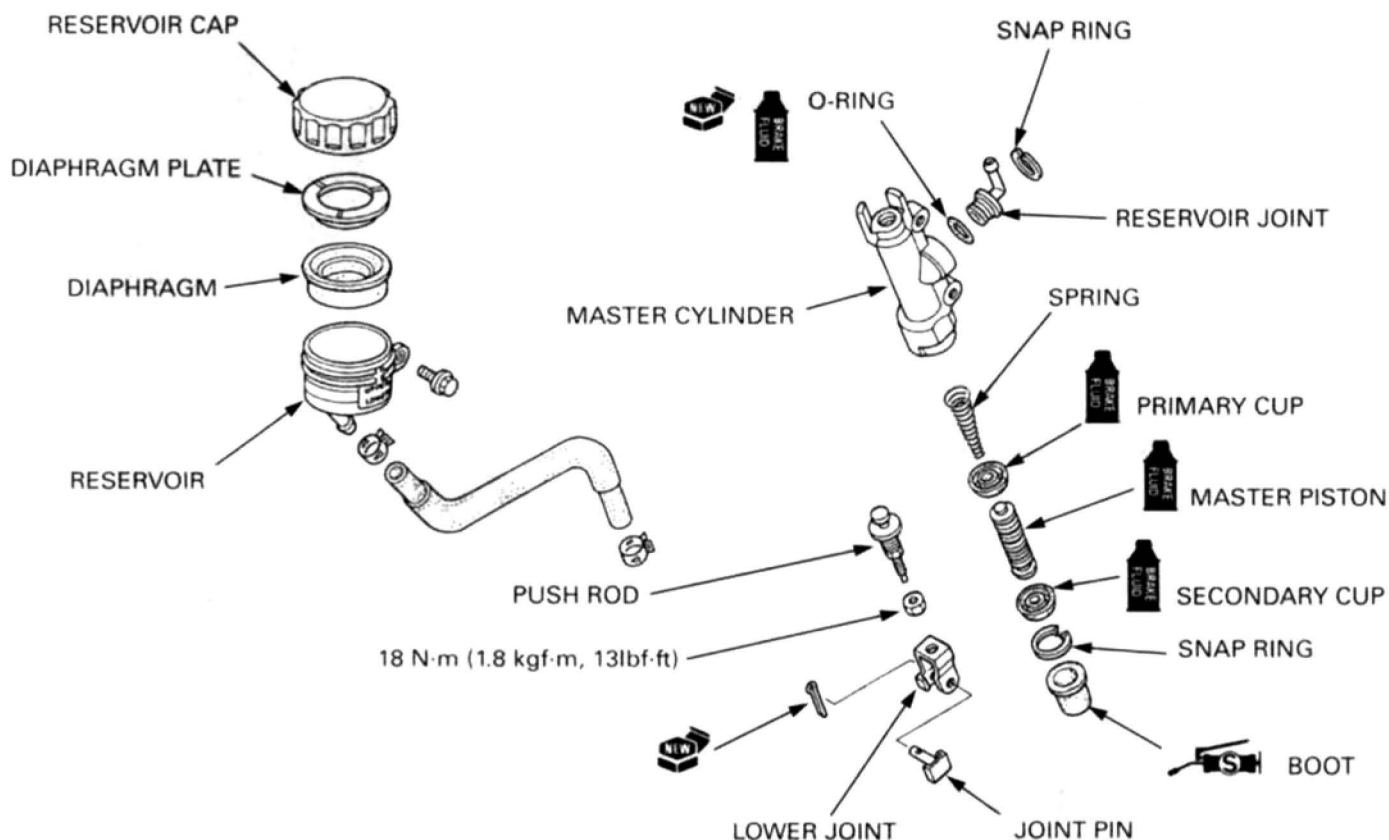
Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.



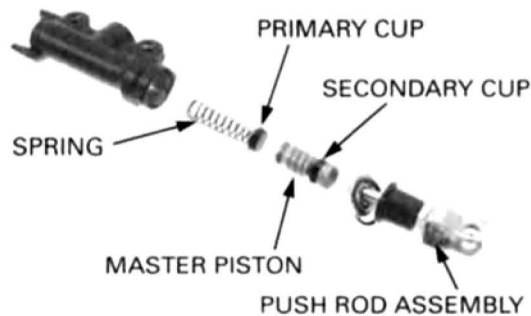
HYDRAULIC BRAKE

ASSEMBLY



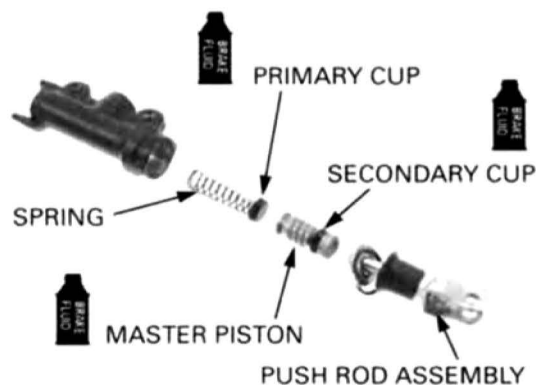
Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.



When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid.
Install the spring to the primary cup.
Apply silicone grease to the piston contact area of the push rod.
Install the spring/primary cup and master piston assembly.



Install the push rod into the master cylinder.

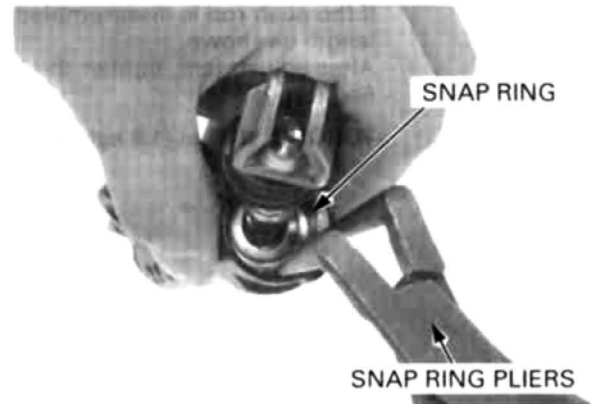
Be certain the snap ring is firmly seated in the groove.

Install the snap ring.

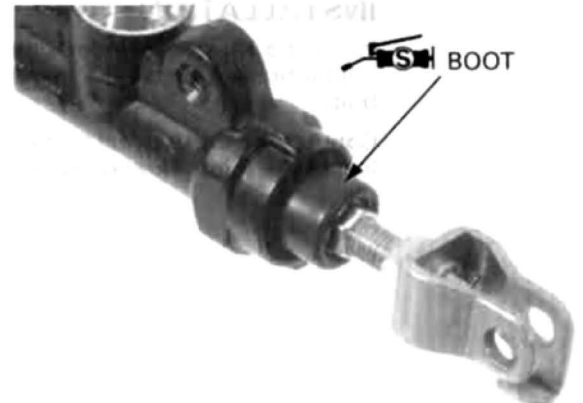
TOOL:

Snap ring pliers

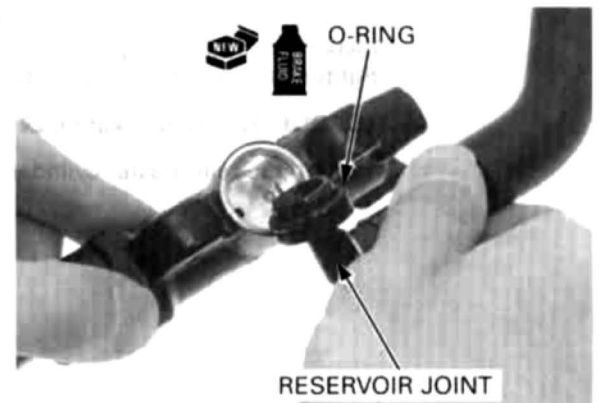
07914-SA50000



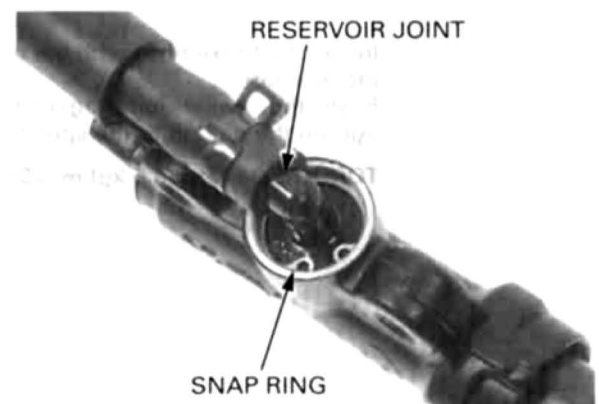
Apply silicone grease to inside of the boot.
Install the boot into the master cylinder properly.



Apply brake fluid to a new O-ring and install it onto the reservoir joint.
Install the reservoir joint into the master cylinder.



Secure the reservoir joint with snap ring.

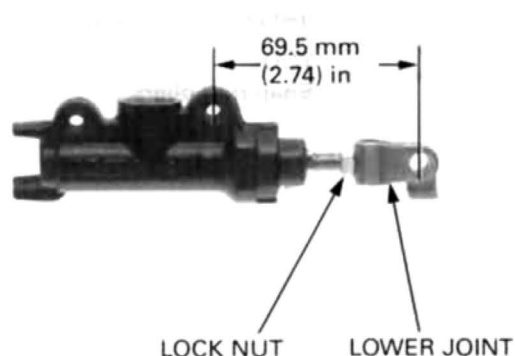


HYDRAULIC BRAKE

If the push rod is disassembled, adjust the push rod length as shown.

After adjustment, tighten the lock nut to the specified torque.

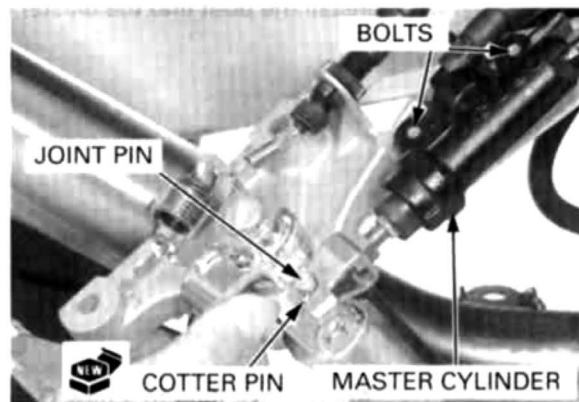
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



INSTALLATION

Place the master cylinder onto the main footpeg holder bracket, install the master cylinder mounting bolts.

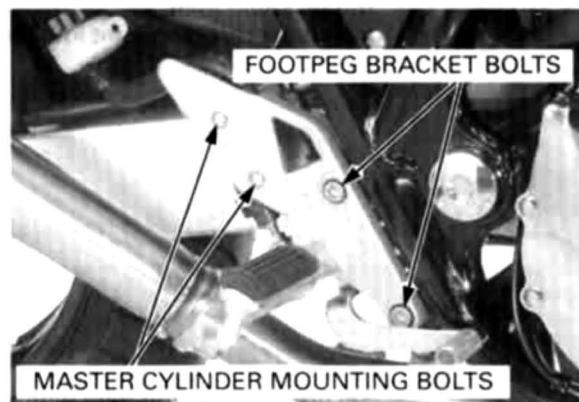
Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.



Install the right footpeg bracket onto the frame, tighten the mounting bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

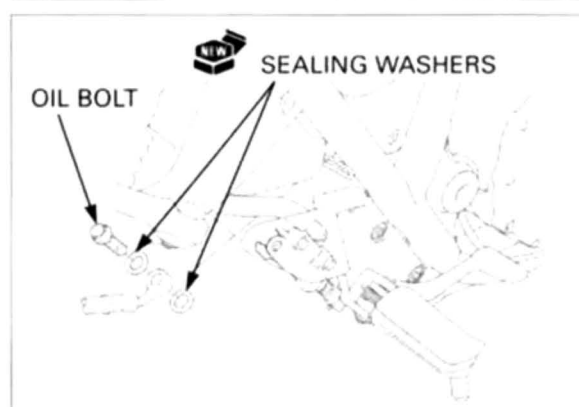
Tighten the rear master cylinder mounting bolts.



Install the brake hose with the oil bolt and new sealing washers.

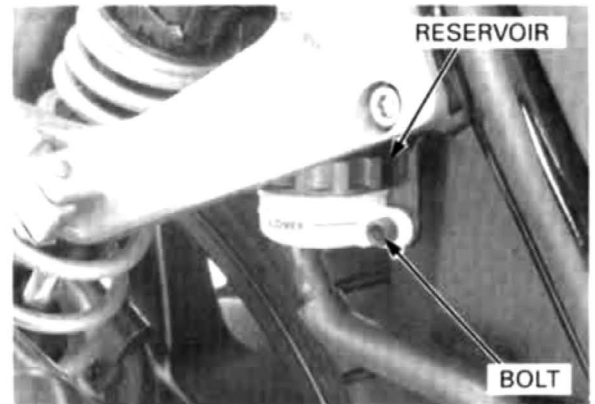
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Install and tighten the brake reservoir mounting bolt securely.

Fill the reservoir to the upper level (page 15-7) and bleed the brake system (page 15-8).



FRONT BRAKE CALIPER

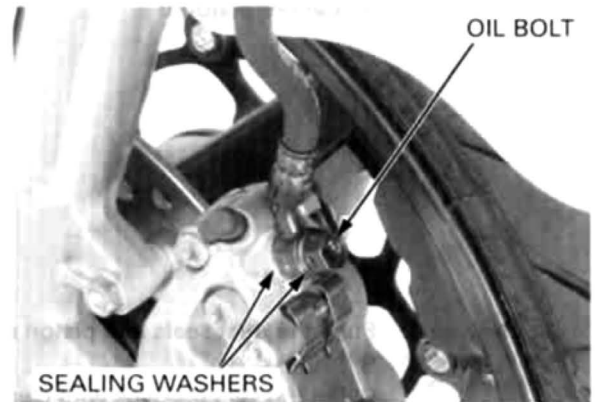
REMOVAL

Drain the front brake hydraulic system (page 15-6).

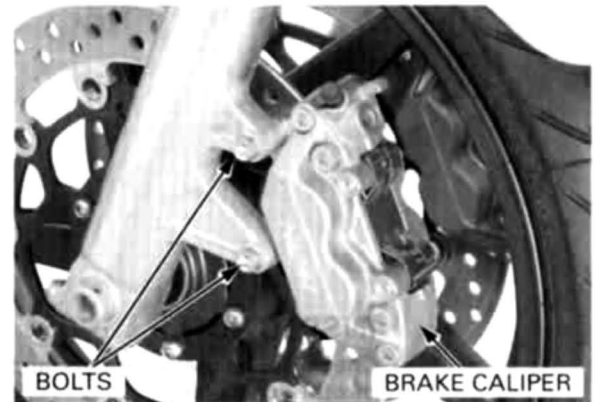
Avoid spilling fluid on painted, plastic, or rubber parts.

Place a rag over these parts whenever the system is serviced

Remove the oil bolt, sealing washers and brake hose eyelet joint.



Remove the caliper mounting bolts, caliper and the brake pads (page 15-9).

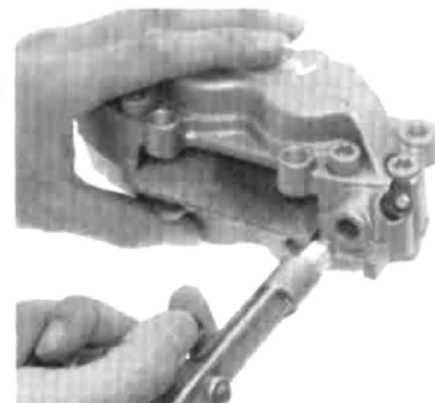


DISASSEMBLY

Install corrugated cardboard or soft wood sheet between the pistons.

Do not use high pressure air or bring the nozzle too close to the inlet.

Apply small squirts of air pressure to the fluid inlet to remove the pistons.



HYDRAULIC BRAKE

Remove the four caliper assembly bolts and separate the caliper halves.

Mark the pistons to ensure correct reassembly.

Remove the following:

- Joint seals
- Caliper piston A
- Caliper piston B

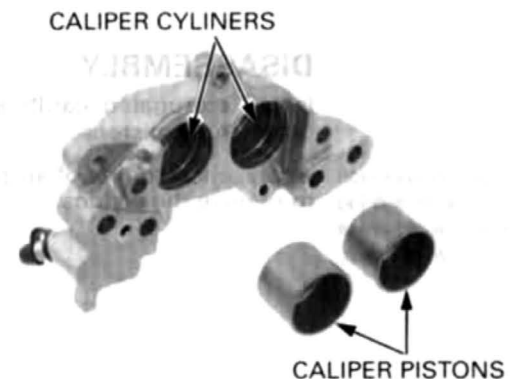
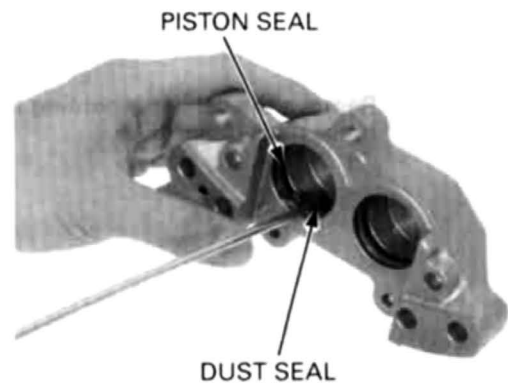
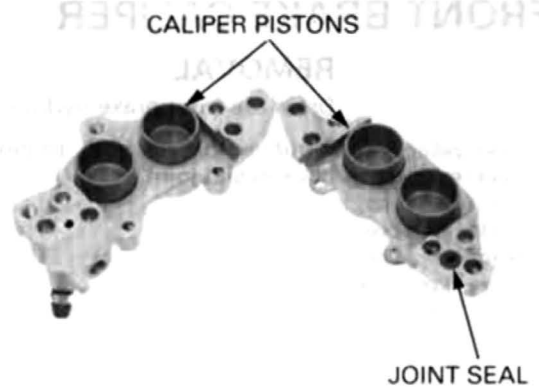
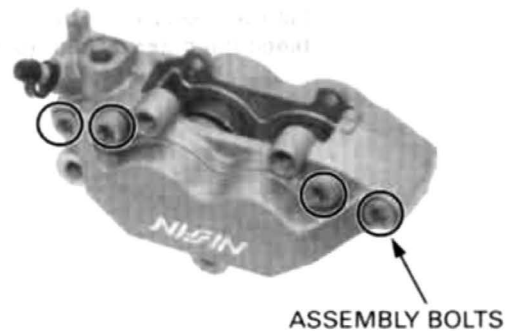
Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.

INSPECTION

Check the caliper cylinders and pistons for scoring or other damage.

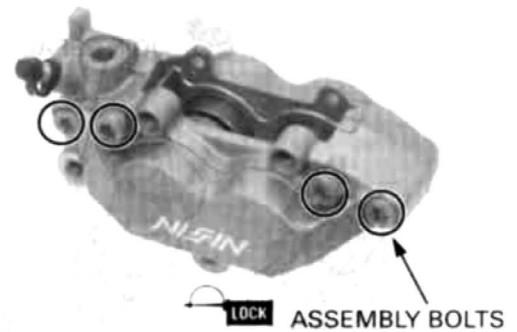




HYDRAULIC BRAKE

Assemble the caliper halves.
Apply a locking agent to the caliper assembly bolt threads.
Install and tighten the caliper assembly bolts to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

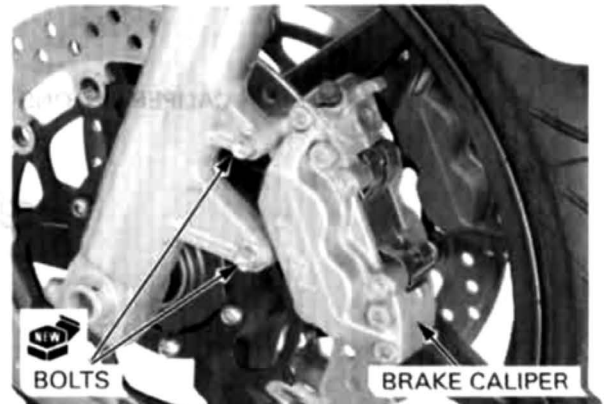


INSTALLATION

Install the brake pads and caliper onto the fork leg (page 15-9).

Install and tighten the new caliper mounting bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

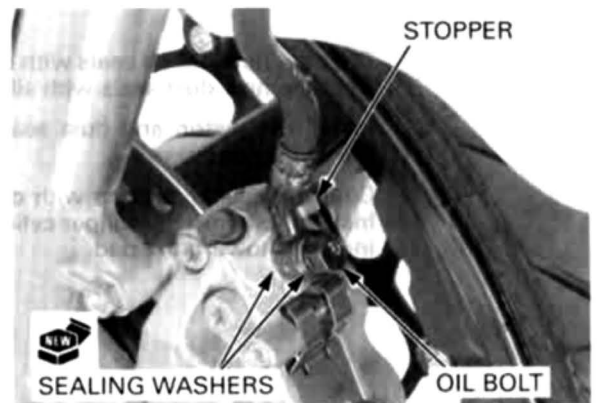


Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 15-7).



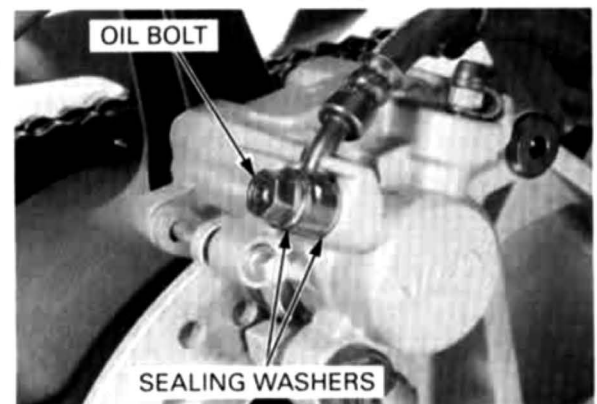
REAR BRAKE CALIPER

REMOVAL

Drain the rear brake hydraulic system (page 15-6).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced

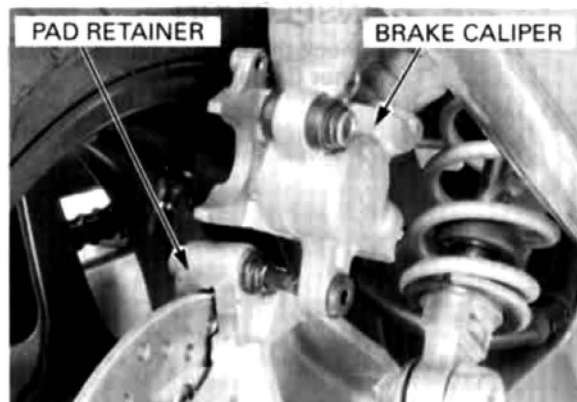
Remove the oil bolt, sealing washers and brake hose eyelet joint.



Remove the caliper bracket bolt and the brake pads (page 15-11).

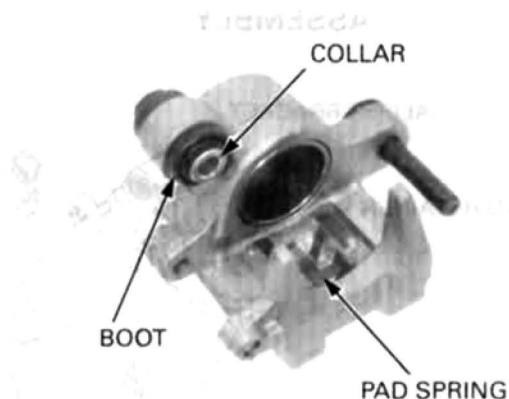
Pivot the caliper up and remove it.

Remove the pad retainer from the caliper bracket.



DISASSEMBLY

Remove the pad spring, collar and boot from the caliper body.



Place a shop towel over the piston.

Do not use high pressure air or bring the nozzle too close to the inlet.

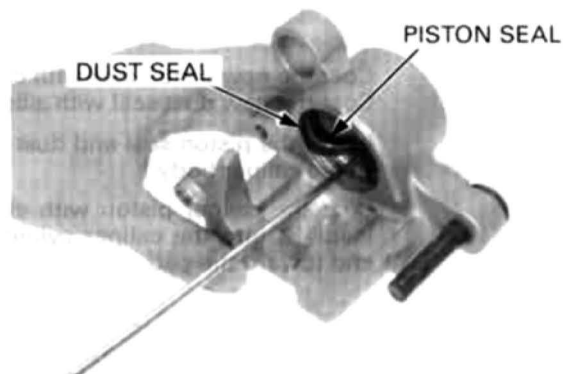
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



Be careful not to damage the piston sliding surface.

Push the dust seal and piston seal in and lift them out.

Clean the seal grooves with clean brake fluid.



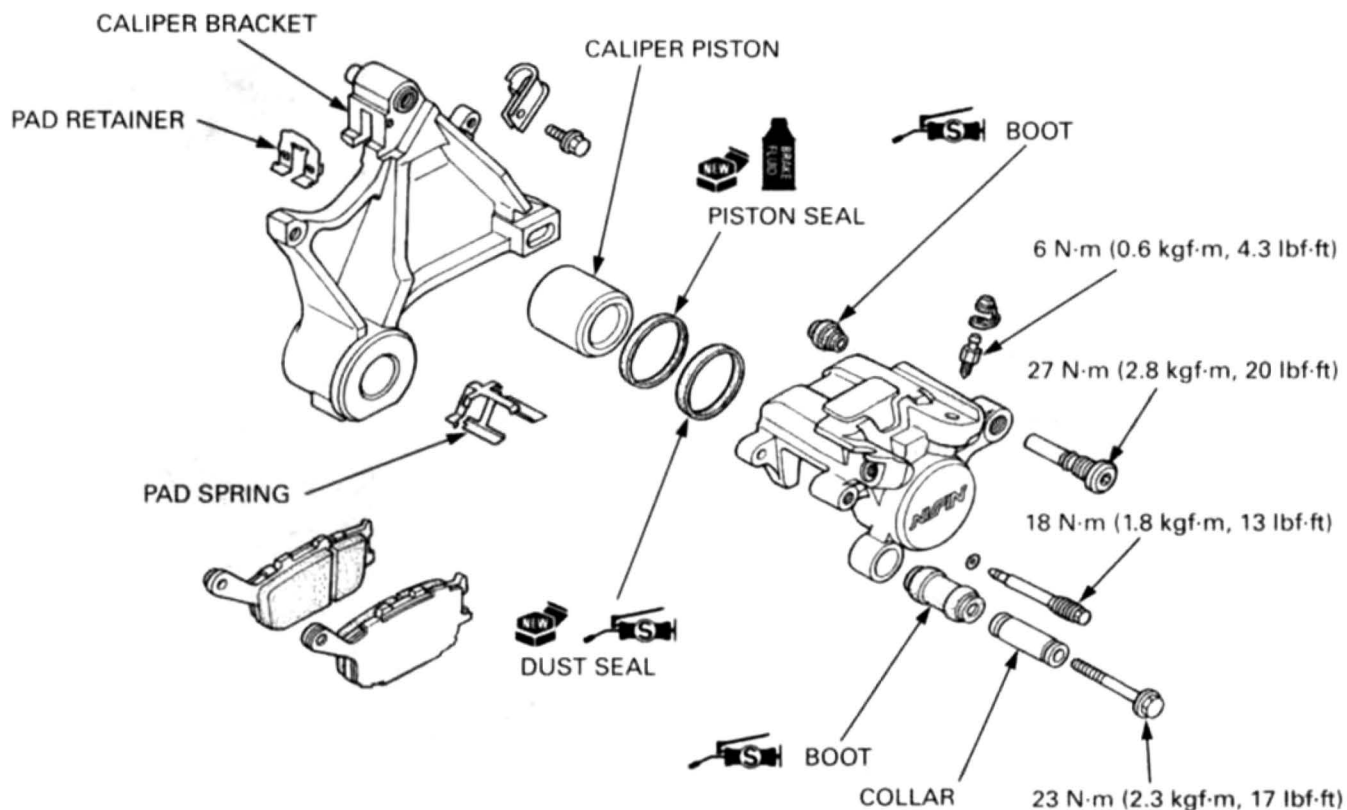
INSPECTION

Check the caliper cylinder and piston for scoring or other damage.

CALIPER CYLINDER

CALIPER PISTON

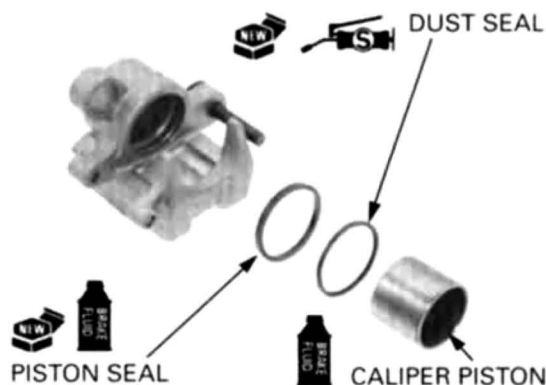
ASSEMBLY



Coat the new piston seal with clean brake fluid.
Coat the new dust seal with silicone grease.

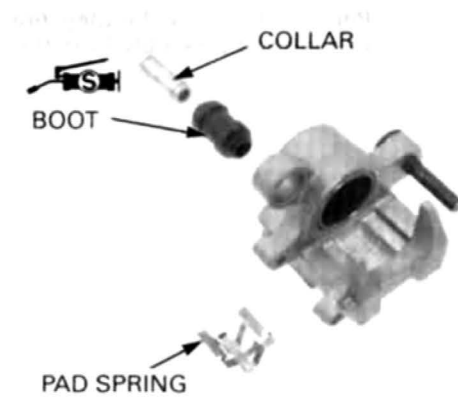
Install the piston seal and dust seal into the groove of the caliper body.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with its opening end toward the pad.



Install the pad spring into the caliper body. If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the inside of the bracket pin boot. Install the bracket pin boot and collar into the caliper.

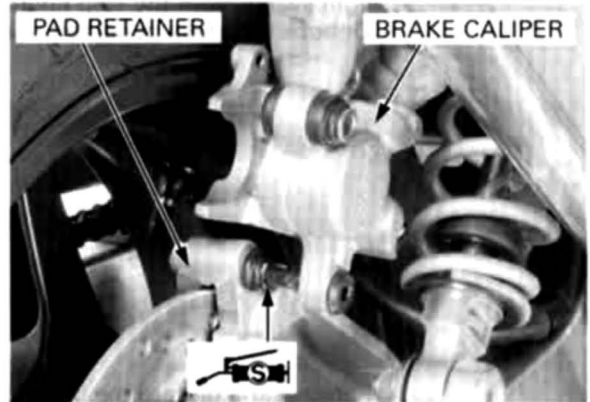


INSTALLATION

Install the pad retainer into the bracket.

Apply silicone grease to the caliper pin and install the caliper onto the bracket.

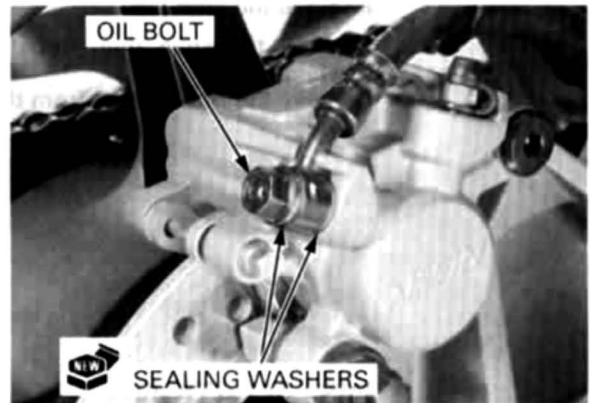
Install the brake pads and caliper bracket bolt (page 15-11).



Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt. Align the brake hose eyelet between the stoppers on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

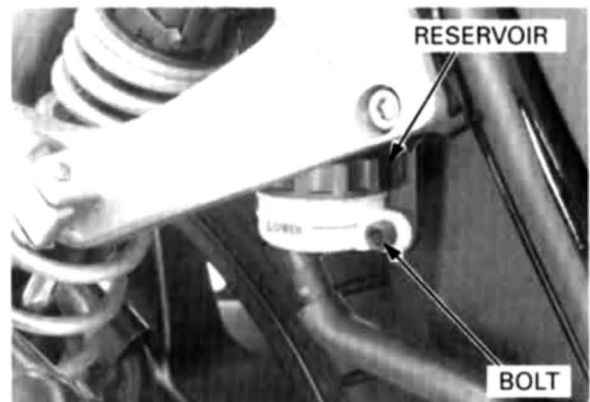
Fill and bleed the rear brake hydraulic system (page 15-6).



BRAKE PEDAL

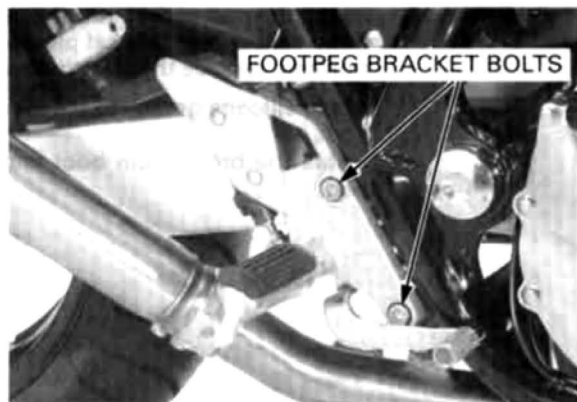
REMOVAL

Remove the rear brake reservoir mounting bolt.

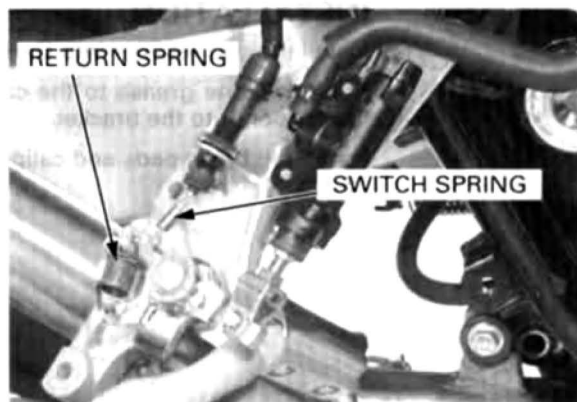


HYDRAULIC BRAKE

Remove the right footpeg bracket mounting bolts and bracket assembly from the frame.



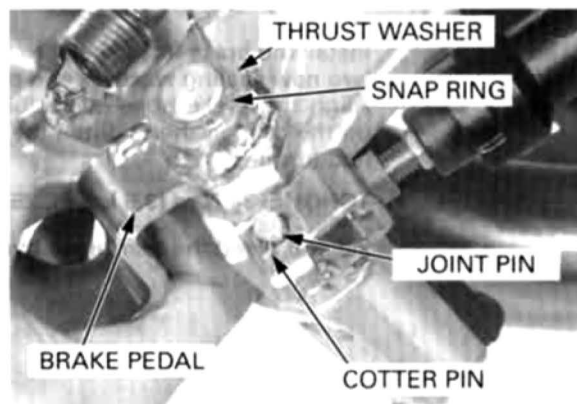
Unhook the return spring and remove the brake light switch from the step holder.
Unhook the brake pedal return spring.



Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.

Remove the snap ring, thrust washer, and wave washer.

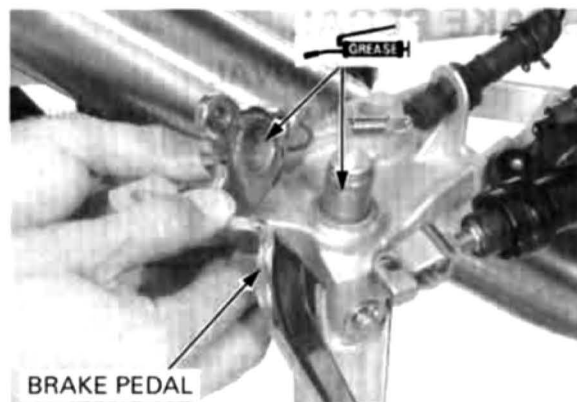
Remove the brake pedal from the pivot.



INSTALLATION

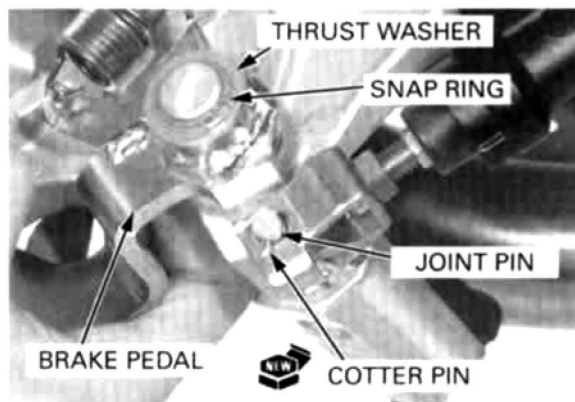
Apply grease to the sliding surface of the brake pedal and footpeg.

Install the brake pedal, wave washer and thrust washer to the pedal pivot.



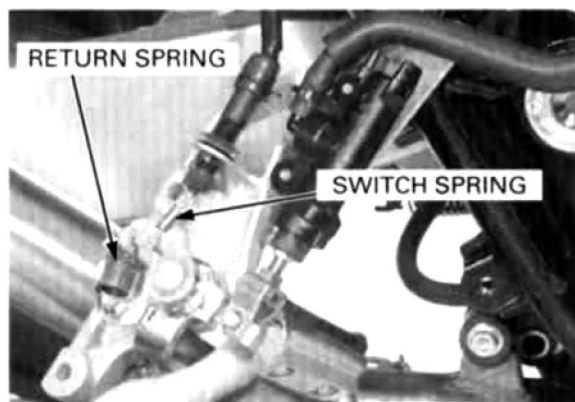
Install a thrust washer and secure the pedal pivot with a snap ring.

Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.



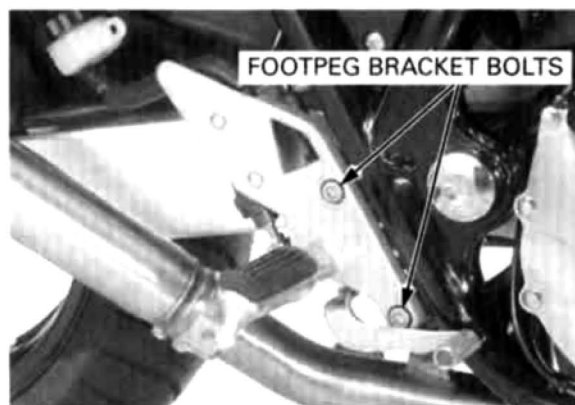
Hook the brake pedal return spring.

Install the brake light switch and hook the switch spring.



Install the right footpeg bracket onto the frame, tighten the mounting bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



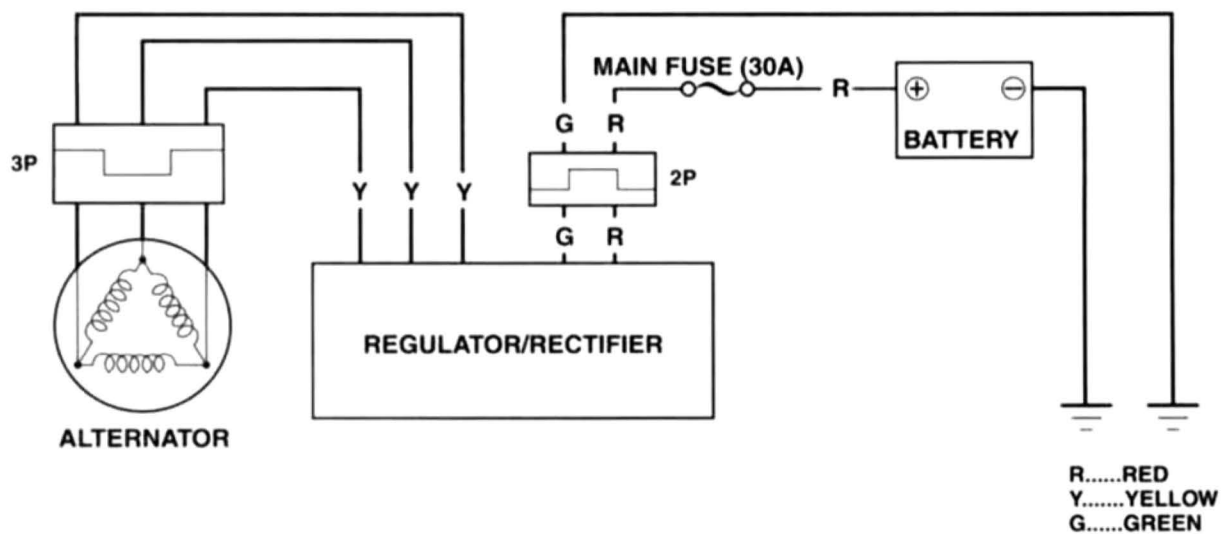
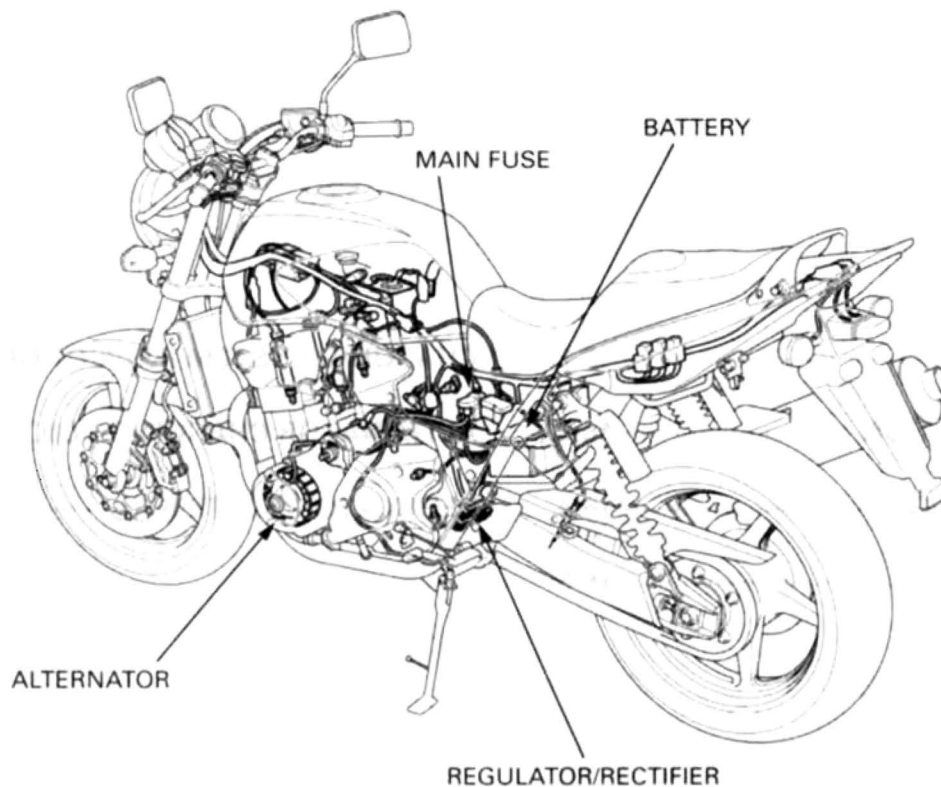
Install the rear brake reservoir and tighten the mounting bolt securely.



16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM.....	16-2	CHARGING SYSTEM INSPECTION.....	16-6
SERVICE INFORMATION	16-3	ALTERNATOR CHARGING COIL	16-6
TROUBLESHOOTING	16-4	REGULATOR/RECTIFIER	16-7
BATTERY	16-5		

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

NOTICE

- Always turn OFF the ignition switch before disconnecting any electrical components.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart page 16-4.
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.

BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester **BM-210 or BATTERY MATE or equivalent**

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 11 Ah
	Current leakage		2.0 mA max.
	Voltage (20° C/68° F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.5 A/0.5 h
Alternator	Capacity		0.421 kW/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20° C/68° F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 16-5).

Check the battery condition using the recommended battery tester.

RECOMMENDED BATTERY TESTER:

BM210 or BATTERY MATE or equivalent

Is the battery good condition?

No – Faulty battery

YES – GO TO STEP 2.

2. CURRENT LEAKAGE TEST

Install the battery (page 16-5).

Check the battery current leakage test (Leak test; page 16-6).

Is the current leakage below 2.0mA?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTOR

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Is the current leakage below 2.0mA?

YES – Faulty regulator/rectifier

NO –

- Shorted wire harness
- Faulty ignition switch

4. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 16-6).

Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20°C/68°F)?

No – Faulty charging coil

YES – GO TO STEP 5.

5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 16-5).

Start the engine.

Measure the charging voltage (page 16-6).

Compare the measurement to result of the following calculation.

STANDARD:

Measured battery Voltage < Measured charging voltage < 15.5 V

Is the measured charging voltage within the standard voltage?

YES – Faulty battery

NO – GO TO STEP 6.

6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 16-7).

Are the results of checked voltage and resistance correct?

YES – Faulty regulator/rectifier

NO –

- Open circuit in related wire
- Loose or poor contacts of related terminal
- Shorted wire harness

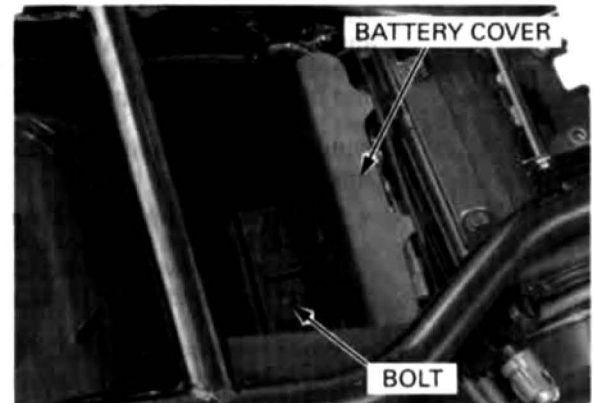
BATTERY

REMOVAL/INSTALLATION

Always turn the ignition switch OFF before removing the battery

Remove the seat (page 3-4).

Remove the battery cover retaining bolt, then remove the battery cover.

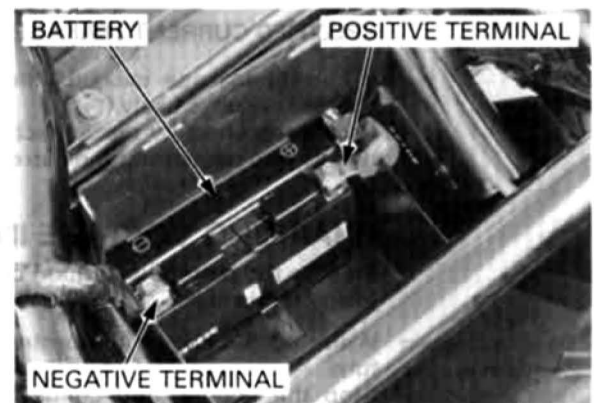


Disconnect the negative cable and then the positive cable, and remove the battery.

Install the battery in the reverse order of removal with the proper wiring as shown.

Connect the positive terminal first and then the negative cable

After installing the battery, coat the terminals with clean grease.



VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:

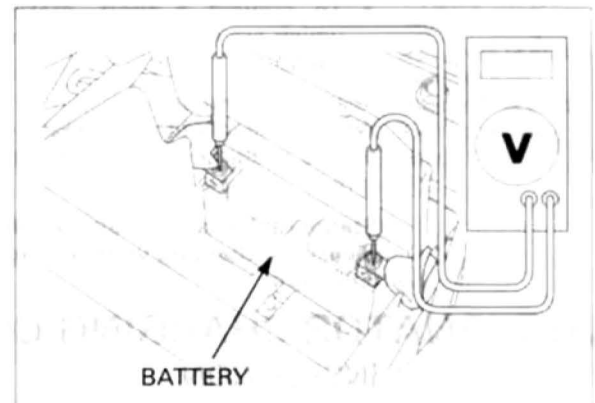
Fully charged: 13.0 – 13.2V

Under charged: Below 12.3V

TOOL:

Digital multimeter

Commercially available



BATTERY CHARGING

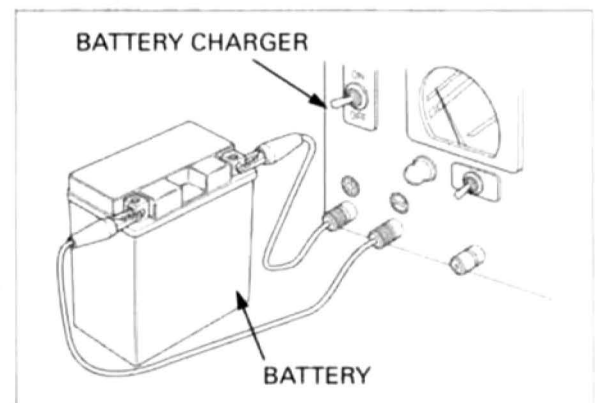
Remove the battery (page 16-5).

Turn power ON/OFF at the charger, not at the battery terminal.

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (-) cable to the battery negative (-) terminal.

- Quick-charging should only be done in an emergency; slow charging is preferred.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.



CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the negative battery cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal.

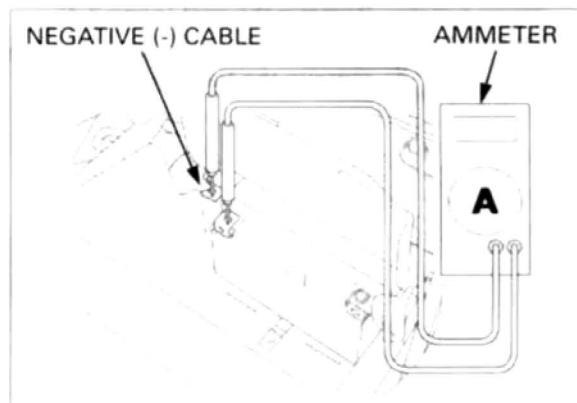
With the ignition switch off, check for current leakage.

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 2.0 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

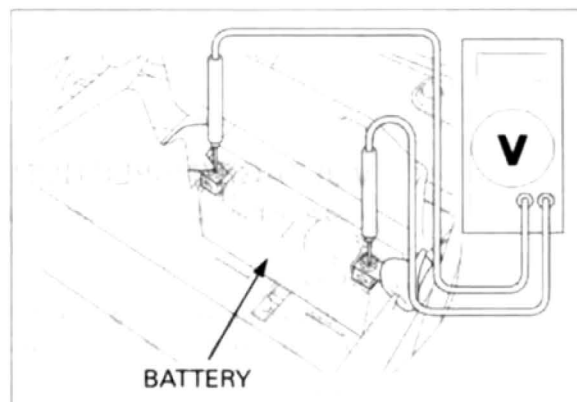
Stop the engine, and connect the multimeter as shown.

- To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

Restart the engine.

With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

Standard: Measured battery voltage (page 16-5) < Measured charging voltage (page 16-6) < 15.5 V at 5,000 rpm

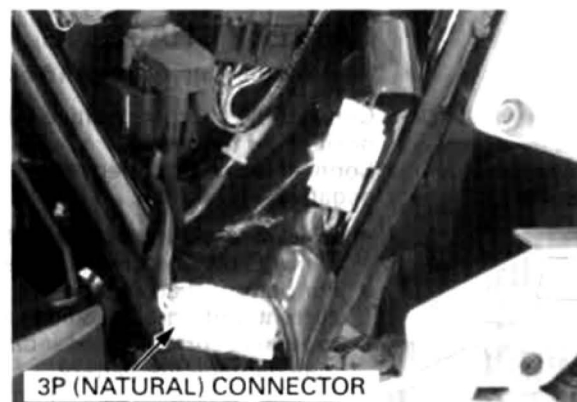


ALTERNATOR CHARGING COIL

INSPECTION

Remove the right side cover (page 3-4).

Disconnect the alternator 3P (Natural) connector.



Check the resistance between all three Yellow terminals.

STANDARD: 0.1 – 1.0 Ω (at 20° C/68° F)

Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.

Refer to section 10 for stator removal.

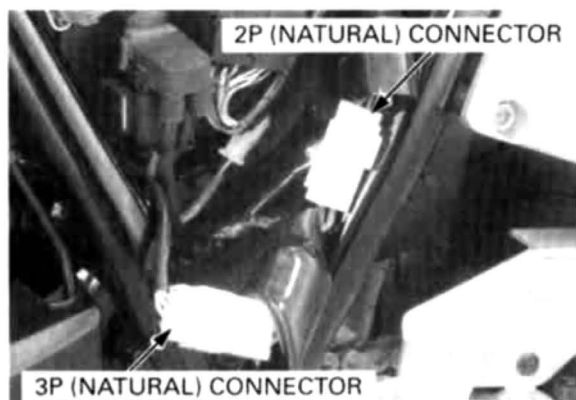


REGULATOR/RECTIFIER

SYSTEM INSPECTION

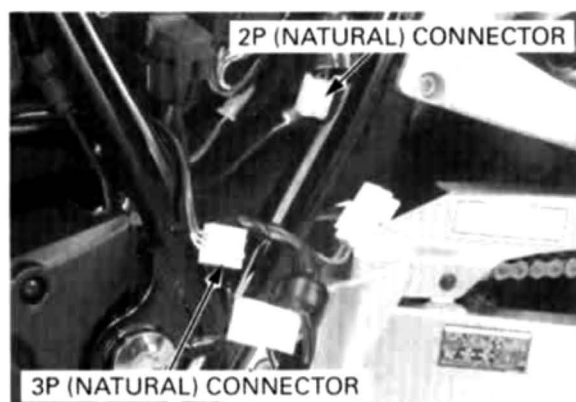
Remove the right side cover (page 3-4).

Disconnect the regulator/rectifier 3P (Natural) and 2P (Natural) connectors, and check it for loose contact or corroded terminals.



If the regulated voltage reading (page 16-6) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 Ω at (20° C/68° F)
Ground line	Green and ground	Continuity should exist



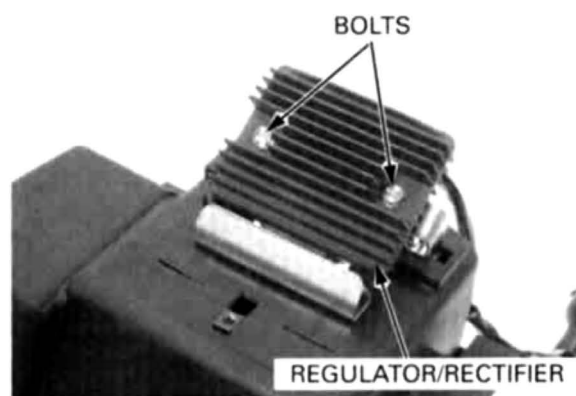
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

Remove the rear fender B (page 3-8).

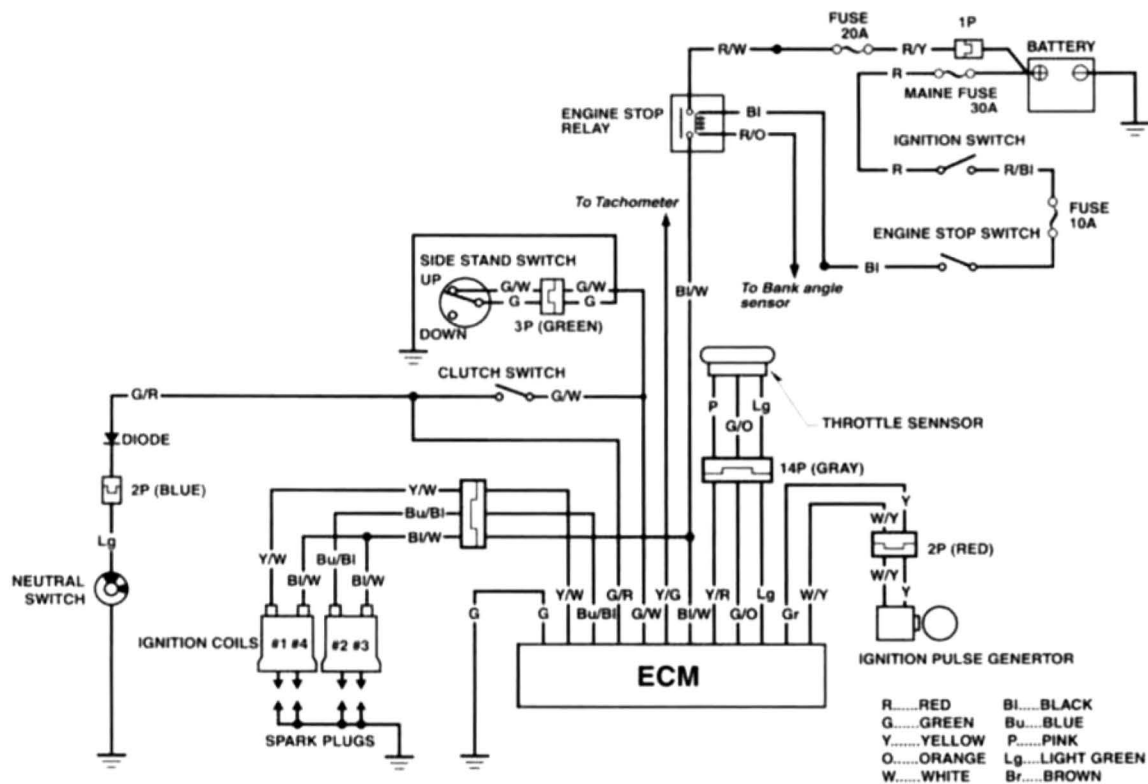
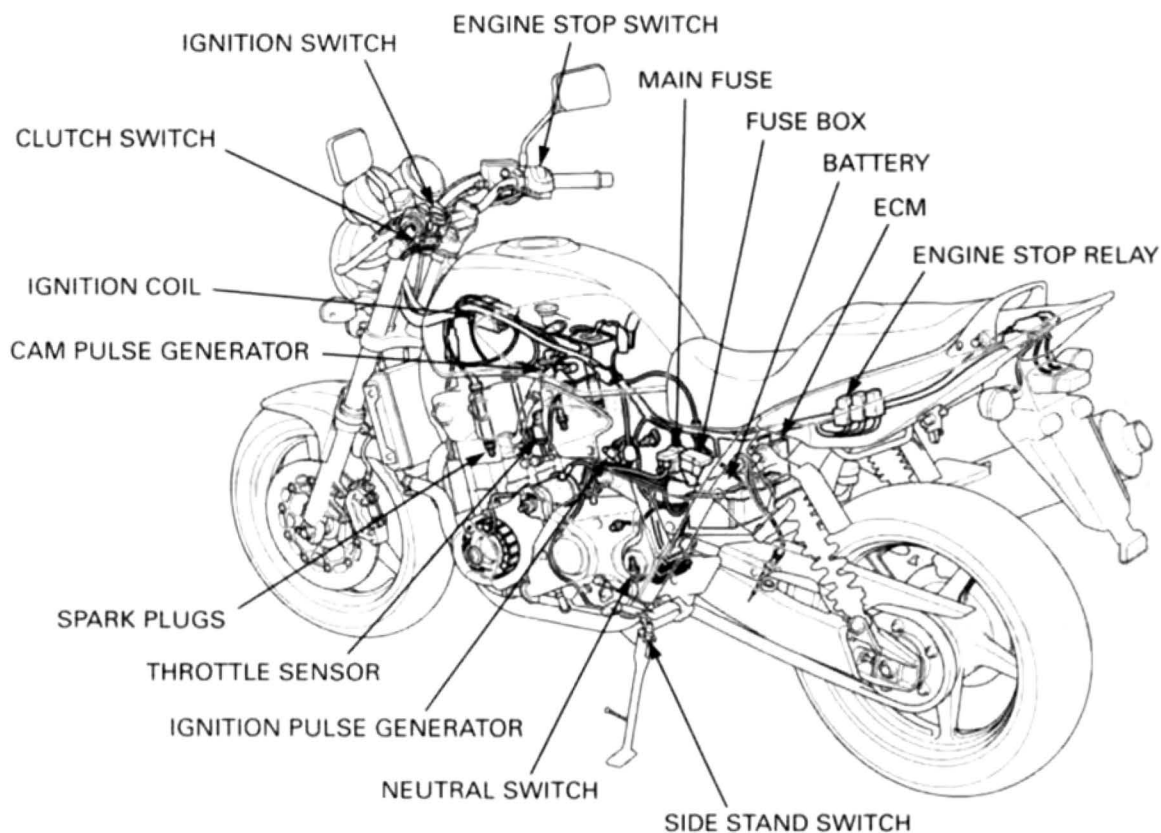
Remove the regulator/rectifier unit mounting bolts, regulator/rectifier and plate.

Install the regulator/rectifier unit in the reverse order of removal.



SYSTEM DIAGRAM.....	17-2	IGNITION COIL	17-7
SERVICE INFORMATION	17-3	IGNITION PULSE GENERATOR.....	17-8
TROUBLESHOOTING	17-4	IGNITION TIMING	17-12
IGNITION SYSTEM INSPECTION	17-5		

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 17-4).
- This motorcycle's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Refer to the Throttle Position (TP) sensor inspection (page 6-79), cam pulse generator inspection (page 6-78) and ECM inspection (page 6-83).

SPECIFICATIONS

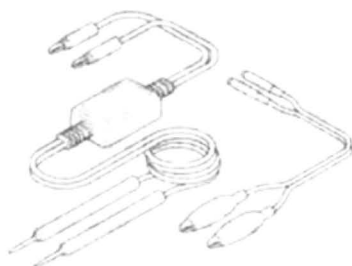
ITEM		SPECIFICATIONS
Spark plug (option)	NGK	DPR8EA-9 (DPR9EA-9)
	DENSO	X24EPR-U9 (X27EPR-U9)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F"mark)		5° BTDC at idle

TOEQUE VALUES

Spark plug	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads Apply oil to the threads and seating surface
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Ignition pulse generator rotor flange bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Rear upper engine hanger plate bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Rear upper engine hanger bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	

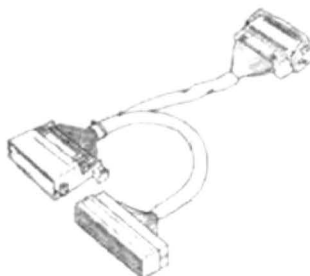
TOOLS

Peak voltage adaptor
07HGJ-0020100



with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

ECU test harness 32P
070MZ-0010201



Two required

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water got into the ignition coil (leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (The engine is not cranked by the starter motor).

No spark at all plugs

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal)	<ol style="list-style-type: none"> Faulty engine stop switch. An open circuit in Black/White wire between the ignition coil and engine stop switch. Loose or poor connect of the ignition coil primary wire terminal, or an open circuit in primary coil (Check at the ECM connector). Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connector)
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	<ol style="list-style-type: none"> Incorrect peak voltage adaptor connections. Undercharged battery. No voltage between the Black/White (+) and Body ground (–) at the ECM multi-connector or loosen ECM connection. An open circuit or loose connection in Green wire. An open circuit or loose connection in Blue/Black and Yellow/White wires between the ignition coils and ECM. Short circuit in ignition primary coil. Faulty side stand switch or neutral switch. An open circuit or loose connection in No.7 related circuit wires. <ul style="list-style-type: none"> Side stand switch line: Green/White wire Neutral switch line: Light Green wire Faulty ignition pulse generator (measure the peak voltage). Faulty ECM (in case when above No. 1 – 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	<ol style="list-style-type: none"> Faulty peak voltage adaptor connections. Faulty peak voltage adaptor. Faulty ECM (in case when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	<ol style="list-style-type: none"> The multimeter impedance is too low; below 10 MΩ DCV. Cranking speed is too low (battery under-charged). The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). Faulty ECM (in case when above No. 1 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	<ol style="list-style-type: none"> Faulty spark plug or leaking ignition coil secondary current ampere. Faulty ignition coil (s).
Ignition pulse generator	Peak voltage is lower than standard value.	<ol style="list-style-type: none"> The multimeter impedance is too low; below 10 MΩ DCV. Cranking speed is too low (battery under charged). The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). Faulty ECM (in case when above No. 1 – 3 are normal).
	No peak voltage.	<ol style="list-style-type: none"> Faulty peak voltage adaptor. Faulty ignition pulse generator.

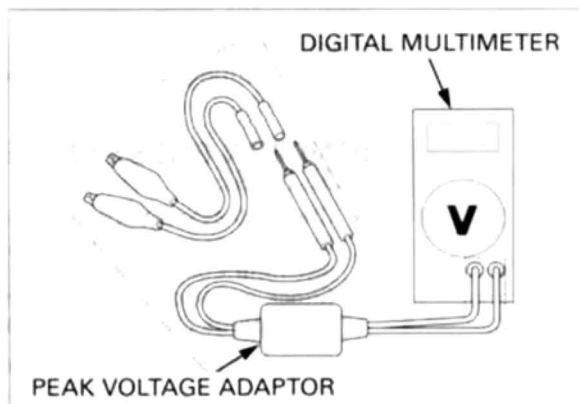
IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)



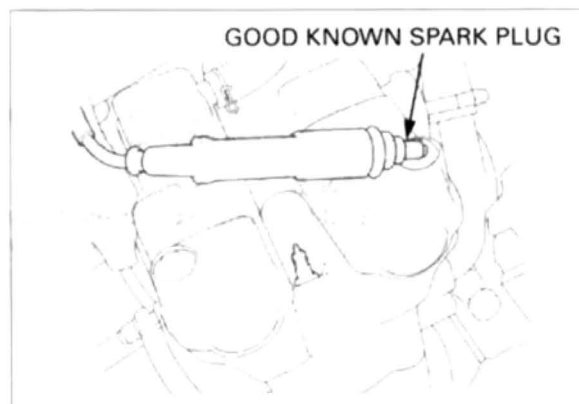
IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Disconnect the spark plug caps from the spark plugs (page 4-8).

Shift the transmission into neutral.

Connect a known good spark plugs to the spark plug caps and ground the spark plugs to the cylinder head as done in a spark test.



With the ignition coil ignition coil primary terminal connected, connect the peak voltage adaptor or Imrie tester to the ignition coil primary wire terminal and ground.

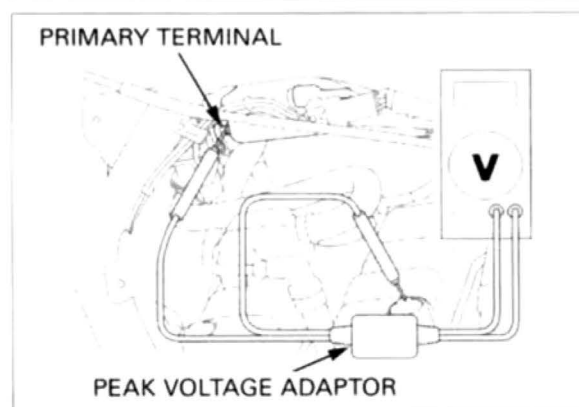
CONNECTION:

No.1/4 coil:

Yellow/White terminal (+) - Body ground (-)

No.2/3 coil:

Blue/Black terminal (+) - Body ground (-)



IGNITION SYSTEM

Avoid touching the spark plugs and tester probes to prevent electric shock

Turn the ignition switch "ON" and engine stop switch to "RUN".

Check for initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, check the power supply circuit (page 17-4).

Crank the engine with the starter motor and read ignition coil primary peak voltage.

PEAK VOLTAGE: 100V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Blue/Black and Yellow/White wires.

If not defects are found in the harness, refer to the troubleshooting chart (page 17-4).

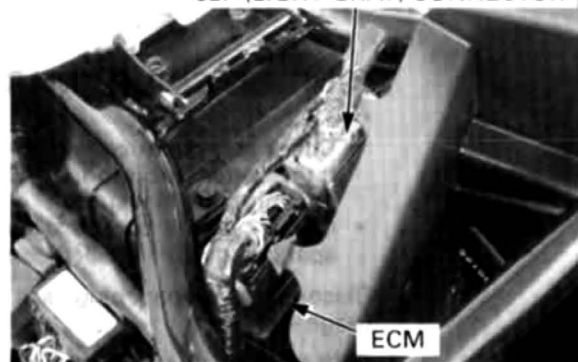
IGNITION PULSE GENERATOR PEAK VOLTAGE

- Check all system connection before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the battery cover (page 16-5).

Disconnect the 32P (Light gray) connector from the ECM.

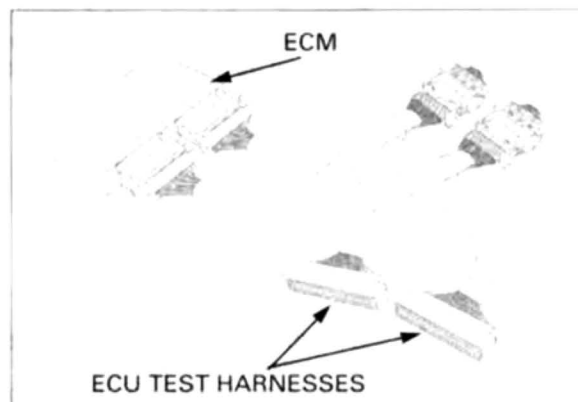
32P (LIGHT GRAY) CONNECTOR



Connect the ECU test harnesses between the main wire harness and the ECM.

TOOLS:

ECU test harness 070MZ-0010201
(two required)



Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire harness side and ground.

TOOLS:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)**

CONNECTION:

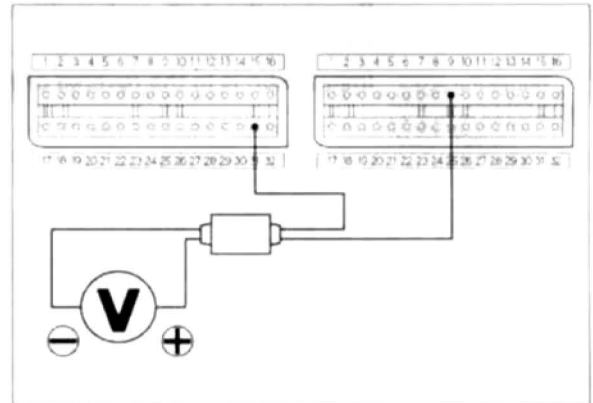
B9 (+) – A31 (–)

*Avoid touching the
spark plugs and
tester probes to
prevent electric
shock.*

Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

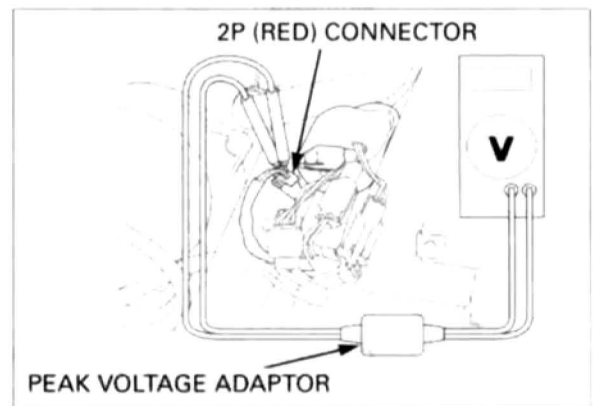
If the peak voltage measured at ECM multi-connector is abnormal, measure the peak voltage at the ignition pulse generator connector.



Remove the right side cover (page 3-4).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/Yellow). In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart. If all items are normal, the ignition pulse generator is faulty. See following steps for ignition pulse generator replacement.



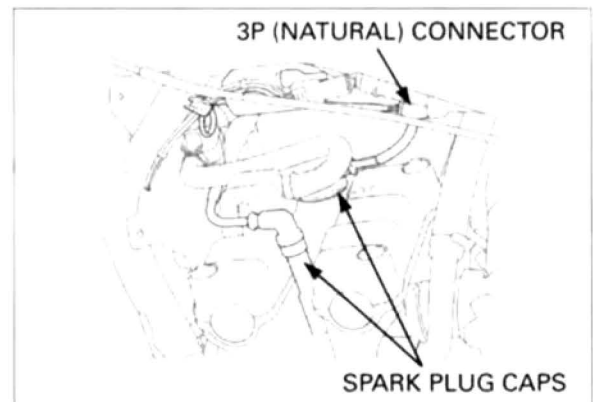
IGNITION COIL

REMOVAL/INSTALLTION

Open and support the front end of fuel tank (page 4-5).

Remove the spark plug caps.
Release the spark plug wires from the clamps.

Disconnect the ignition coil 3P (Natural) connector.

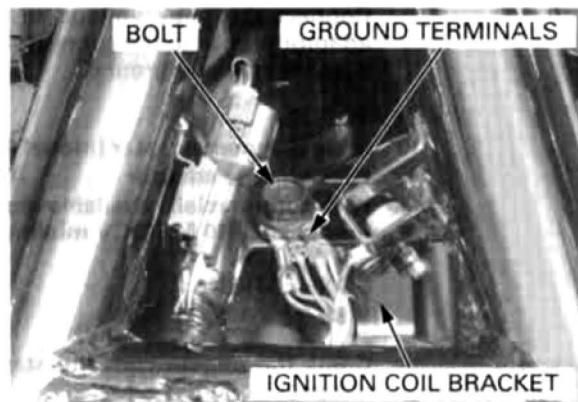


IGNITION SYSTEM

Remove the bolt and ignition coil/bracket as an assembly.

Route the spark plug wires properly (page 1-23)

Installation is in the reverse order of removal.

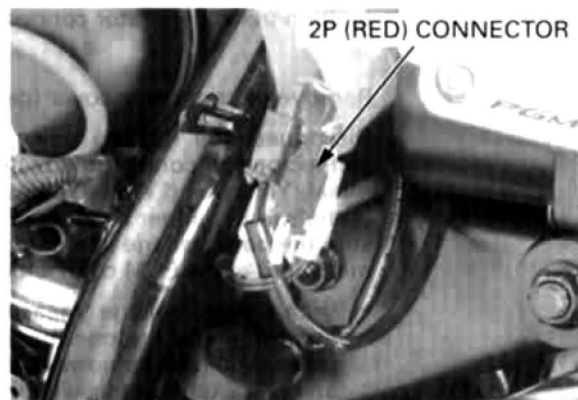


IGNITION PULSE GENERATOR

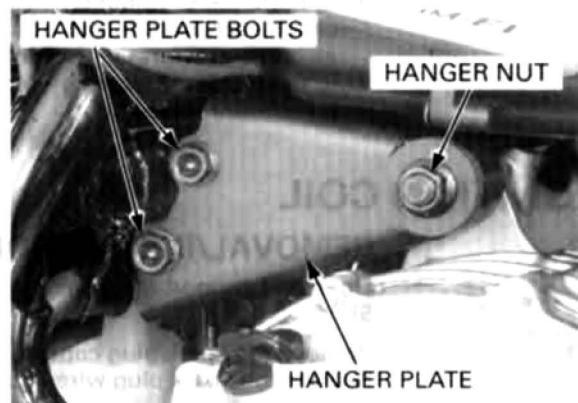
REMOVAL

Remove the right side cover (page 3-4).

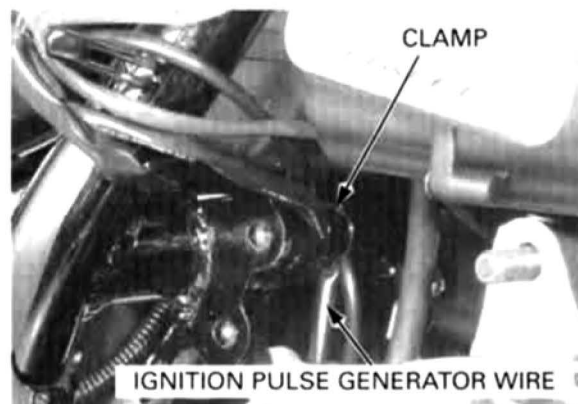
Disconnect the ignition pulse generator 2P (Red) connector.



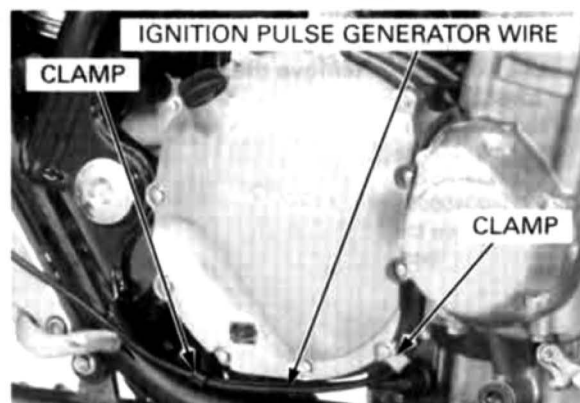
Remove the rear upper engine hanger nut, special washer, hanger plate bolts and hanger plate.



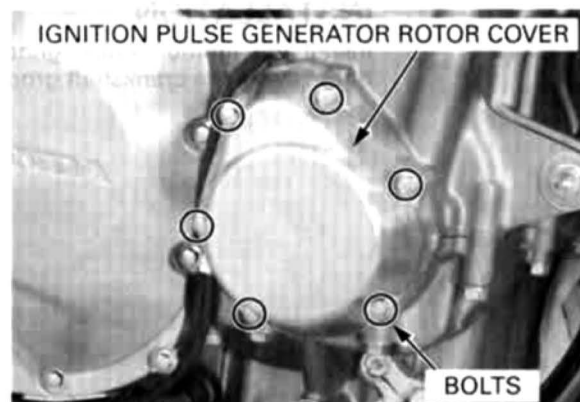
Release the ignition pulse generator wire from the frame clamp.



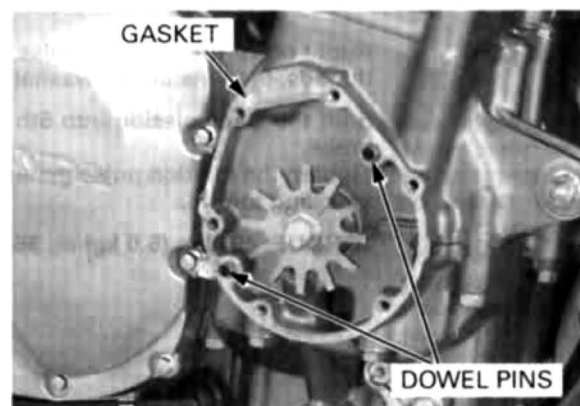
Remove the ignition pulse generator wire from the engine and frame clamps.



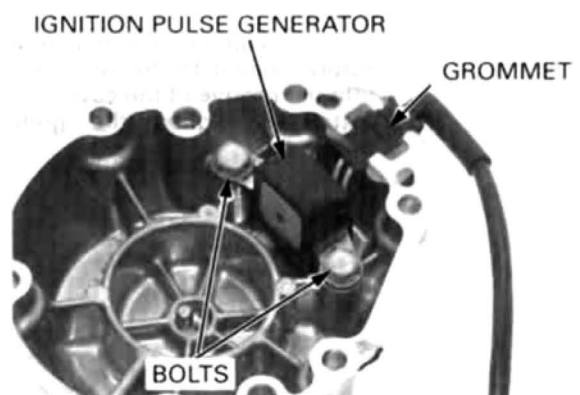
Remove the mounting bolts and ignition pulse generator cover.



Remove the gasket and dowel pins.



Remove the wire grommet from the cover.
Remove the bolts and ignition pulse generator.

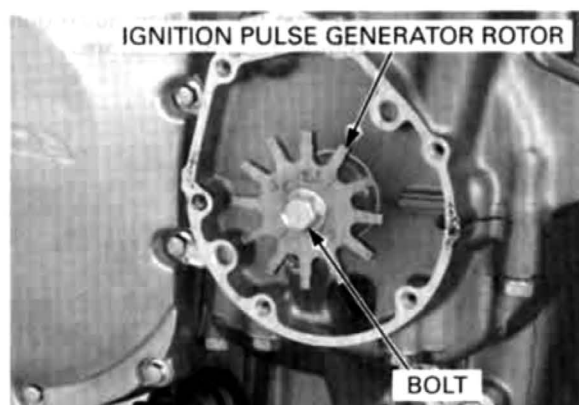


IGNITION SYSTEM

If the engine is out of the frame, remove the alternator cover (page 11-4) and hold the flywheel with the flywheel holder (07725-0040000), then remove the bolt.

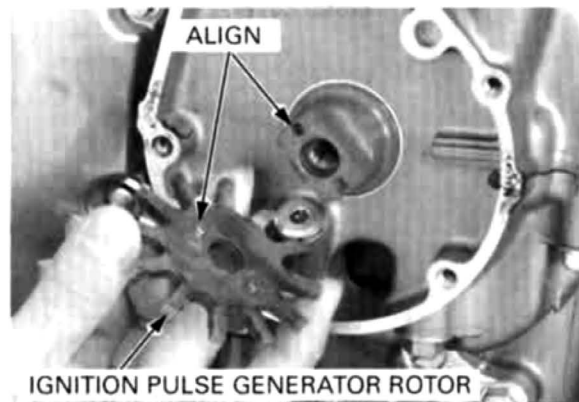
Shift the transmission into 5th gear and apply rear brake.

Remove the ignition pulse generator rotor bolt.



INSTALLATION

Install the ignition pulse generator rotor with its bosses with the crankshaft grooves.



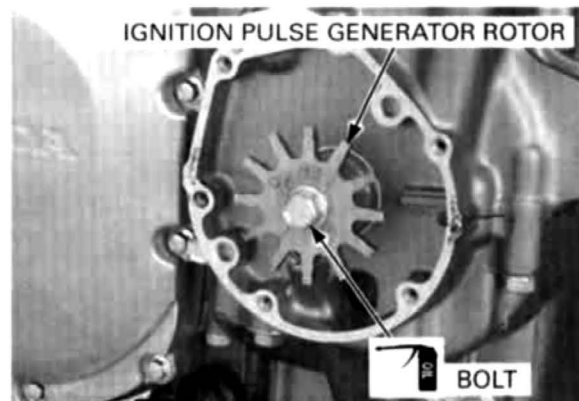
Apply oil to the ignition pulse generator rotor bolt threads, then install the washer and rotor bolt.

If the engine is out of frame, remove the alternator cover (page 11-4) and hold the flywheel with the flywheel holder (07725-0040000), then tighten the bolt.

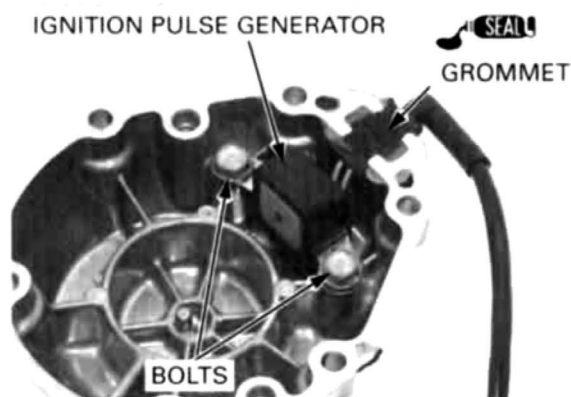
Shift the transmission into 5th gear and apply rear brake.

Tighten the ignition pulse generator rotor bolt to the specified torque.

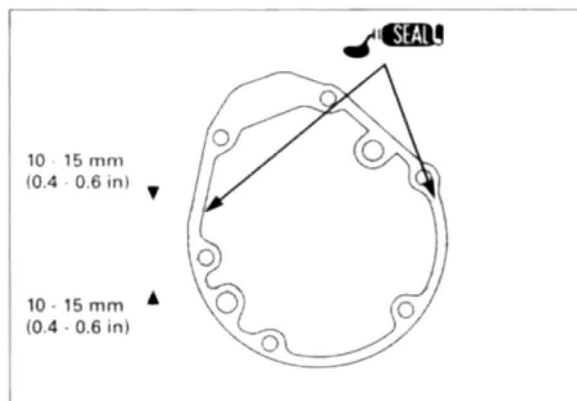
TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



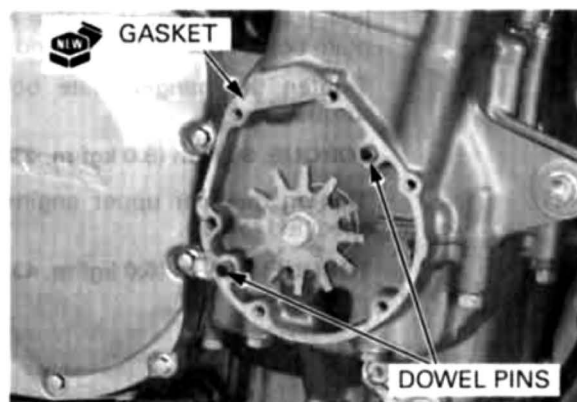
Install the ignition pulse generator into the cover. Apply sealant to the wire grommet, then install it into the groove of the cover. Install and tighten the ignition pulse generator bolts.



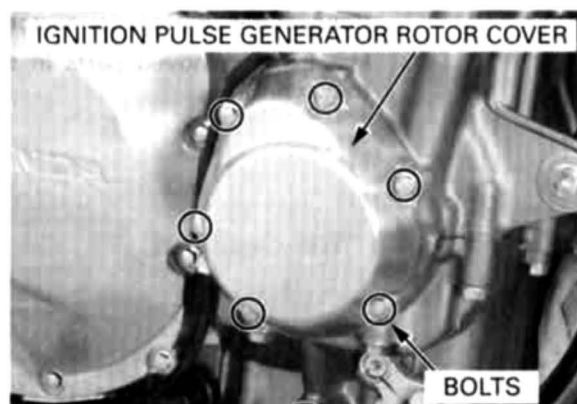
Apply sealant to the mating surfaces of the crank-case.



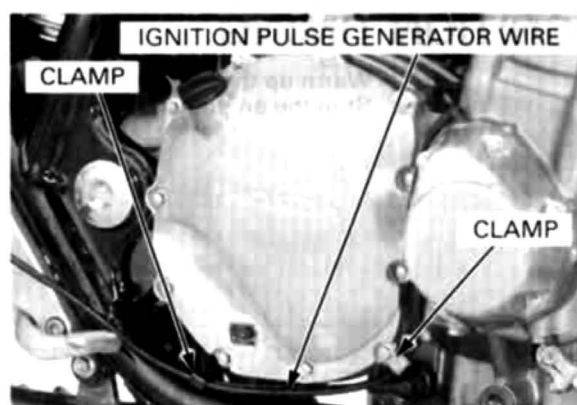
Install the dowel pins and new gasket.



Install the ignition pulse generator cover and tighten the bolts.

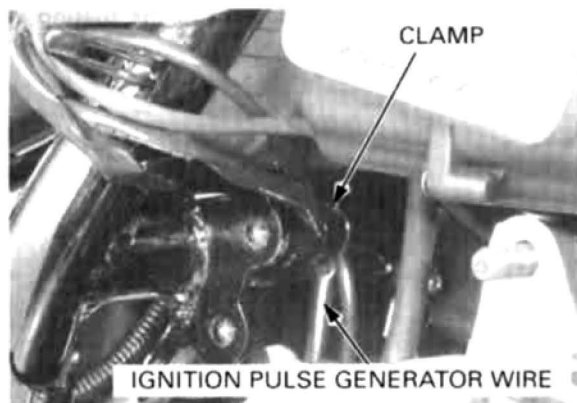


Route the ignition pulse generator wire properly and clamp the wire with the engine and frame clamps.



IGNITION SYSTEM

Clamp the ignition pulse generator wire with the frame clamp.



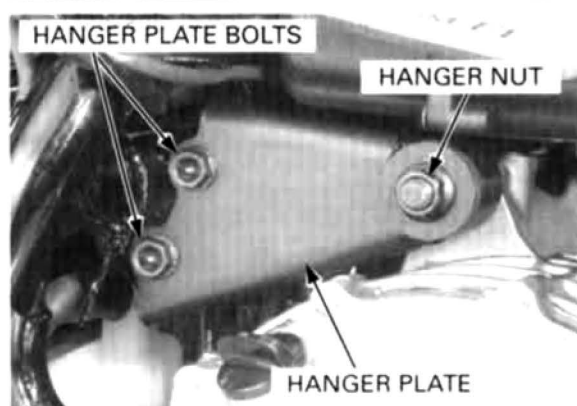
Install the rear upper engine hanger plate, hanger plate bolts, special washer and hanger nut.

Tighten the hanger plate bolts to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

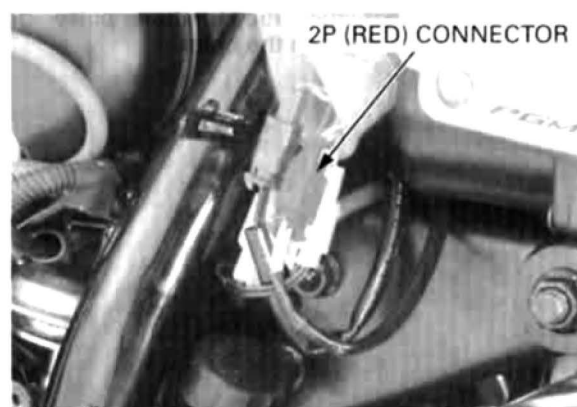
Tighten the rear upper engine hanger nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Connect the 2P (Red) connector.

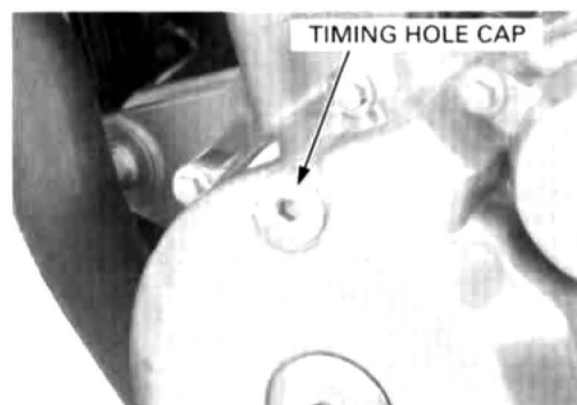
Install the removed parts in the reverse order of removal.



IGNITION TIMING

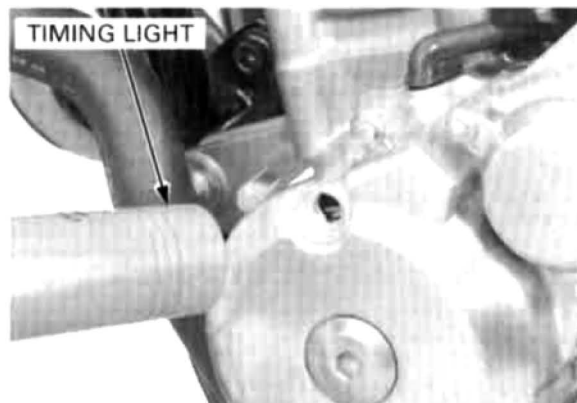
Warm up the engine.

Stop the engine and remove the timing hole cap.



Read the instructions for timing light operation.

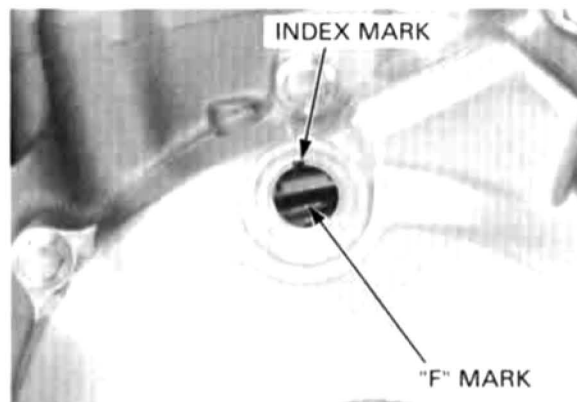
Connect the timing light to the No.1 spark plug wire.



Start the engine and let it idle.

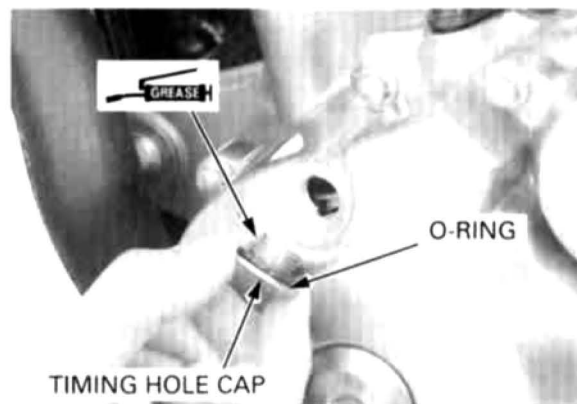
IDLE SPEED: $1,000 \pm 100 \text{ min}^{-1} \text{ (rpm)}$

The ignition timing is correct if the index mark on the alternator cover aligns with the "F" mark on the flywheel rotor as shown.



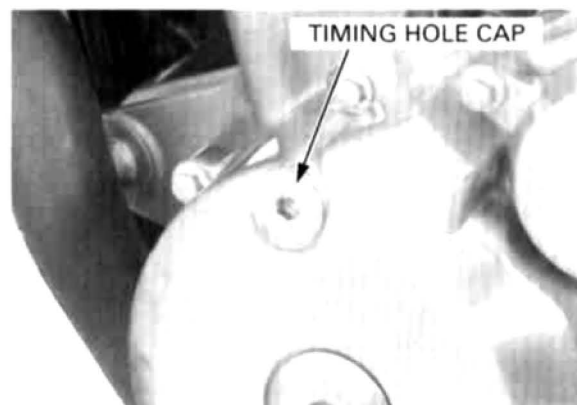
Check the O-ring is in good condition, replace if necessary.

Apply grease to the timing hole cap threads and install the O-ring and timing hole cap.



Tighten the timing hole cap to the specified torque.

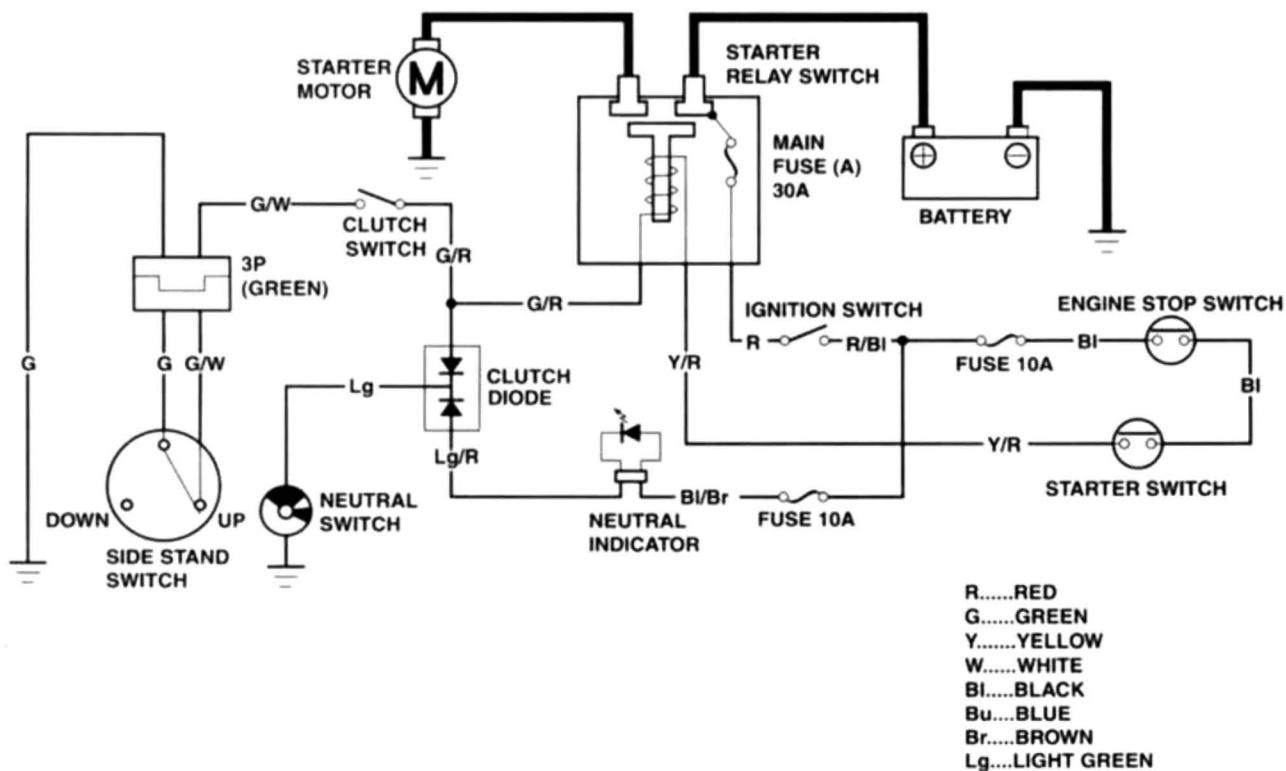
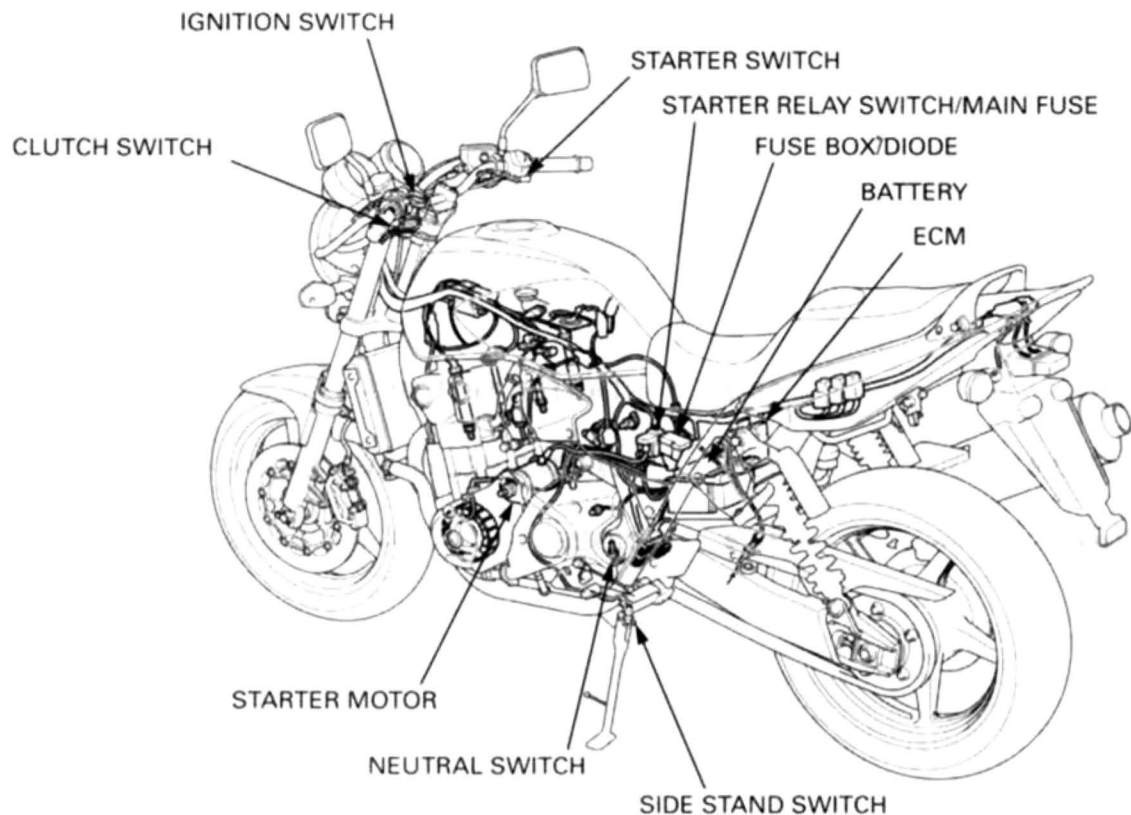
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



18. ELECTRIC STARTER

SYSTEM DIAGRAM.....	18-2	STARTER MOTOR.....	18-6
SERVICE INFORMATION	18-3	STARTER RELAY SWITCH.....	18-15
TROUBLESHOOTING	18-4	DIODE.....	18-16

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- Refer to the starter clutch servicing (page 11-7).
- Refer to the following components informations.
 - Ignition switch (page 19-23)
 - Engine stop switch (page 19-24)
 - Starter switch (page 19-24)
 - Neutral switch (page 19-26)
 - Side stand switch (page 19-26)
 - Clutch switch (page 19-25)

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

TOEQUE VALUES

Starter motor terminal nut 10 N·m (1.0 kgf·m, 7 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Did the fuse blow?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition.

Is the battery in good condition?

YES – Replace the fuse

NO – GO TO STEP 3.

3. Starter Relay switch operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch button is depressed.

Did the "CLICK" hear?

YES – GO TO STEP 4.

NO – GO TO STEP 5.

4. Starter Motor Inspection

Apply battery voltage to the starter motor directly and check the operation.

Did the starter motor turn?

YES – • Poorly connected starter motor cable
• Faulty starter relay switch (page 18-15)

NO – Faulty starter motor (page 18-6)

5. Relay Coil Ground Wire Lines Inspection

Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:

1. Green/Red terminal-clutch switch diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/Red terminal/clutch switch – side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up).

Apply battery voltage to the starter motor directly and check the operation.

Are there continuity?

NO – • Faulty neutral switch (page 19-26)
• Faulty neutral diode (page 18-16)
• Faulty clutch switch (page 19-25)
• Faulty side stand switch (page 19-26)
• Loose or poor contact connector
• Open circuit in wire harness

YES – GO TO STEP 6.

6. Starter Relay Voltage Inspection

Connect the starter relay switch connector.

With the ignition switch ON and the starter switch pushed, measure the starter relay voltage at the starter switch connector (between Yellow/Red (+) and ground (-).

Apply battery voltage to the starter motor directly and check the operation.

Is there battery voltage?

- NO** – • Faulty ignition switch (page 19-23)
• Faulty starter switch (page 19-24)
• Faulty engine stop switch (page 19-24)
• Blown out main or sub-fuse
• Faulty clutch switch (page 19-25) / side stand diode (page 18-16)
• Loose or poor contact connector
• Open circuit in wire harness

YES – GO TO STEP 7.

7. Starter Relay Switch Operation

Check the starter relay switch operation.

Is there battery voltage?

NO – Faulty starter relay switch

YES – Loose or poor contact starter relay switch connector

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation.

Is the clutch switch operation normally?

NO – Faulty clutch switch

YES – GO TO STEP 2.

2. Clutch Switch Inspection

Check the side stand switch operation.

Is the side stand switch operation normally?

NO – Faulty side stand switch (page 19-26)

YES – • Open circuit in wire harness
• Loose or poor contact connector

Starter motor turns engine slowly

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poor connected battery ground cable

Starter motor turns, but engine does not turn

- Starter motor is running backwards
 - Case assembled improperly
 - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

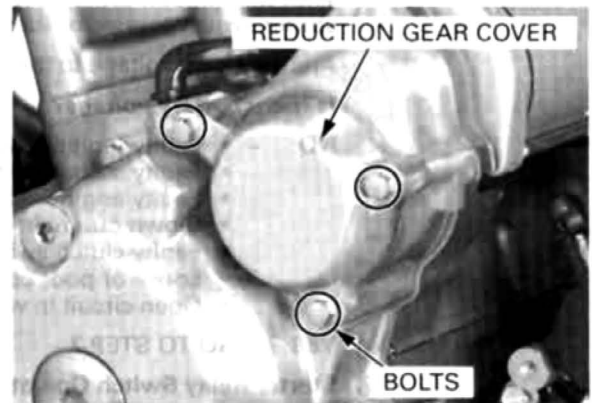
Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems

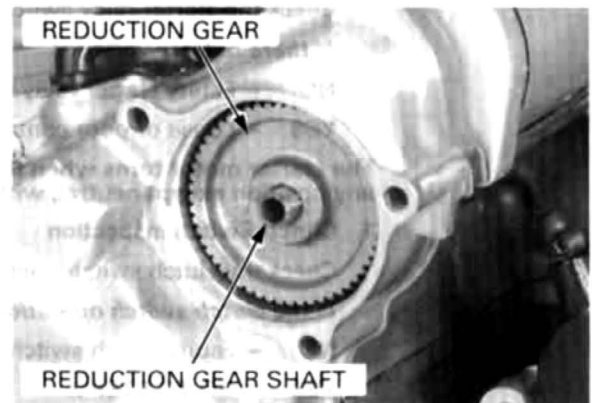
STARTER MOTOR

REMOVAL

Remove the bolts and starter reduction gear cover.

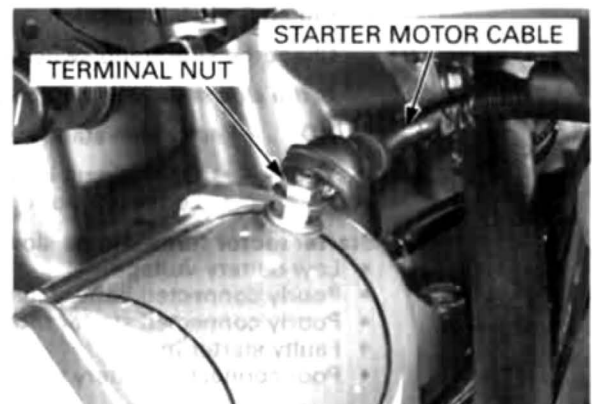


Remove the starter reduction gear shaft and gear.

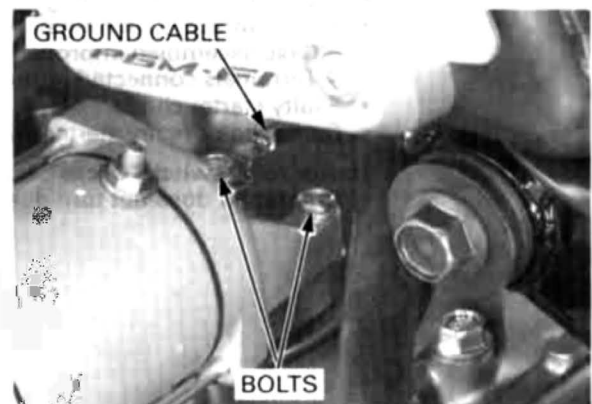


With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

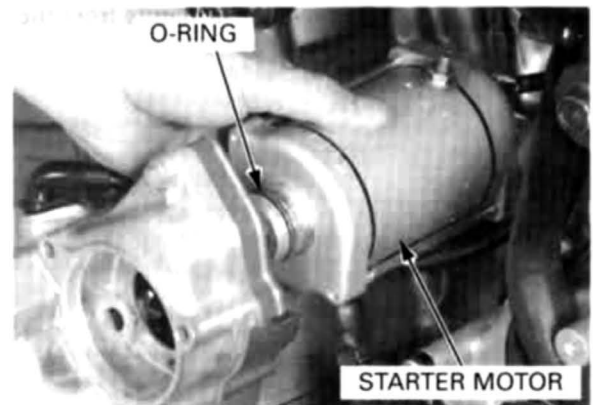
Remove the nut and the starter motor cable from the starter motor.



Remove the starter motor mounting bolts and ground cable.



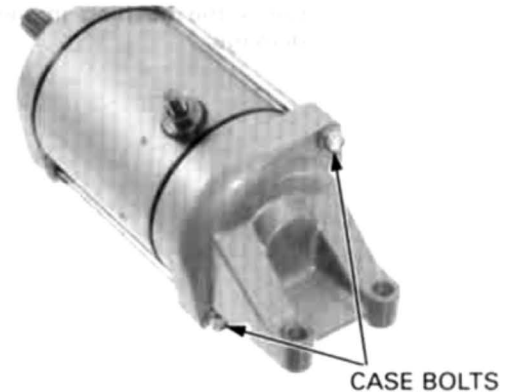
Pull the starter motor out of the crankcase.
Remove the O-ring.



DISASSEMBLY

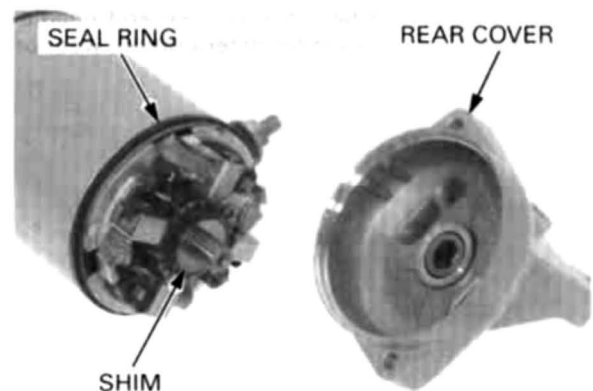
Remove the following:

- Starter motor case bolts



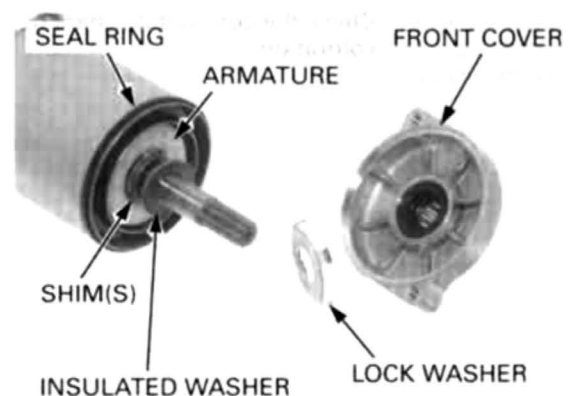
Remove the following:

- Rear cover assembly
- Seal ring
- Shims



*Record the location
and number of
shims*

- Front cover
- Seal ring
- Lock washer
- Insulated washer
- Shim (s)



ELECTRIC STARTER

Remove the armature from the motor case.

MOTOR CASE

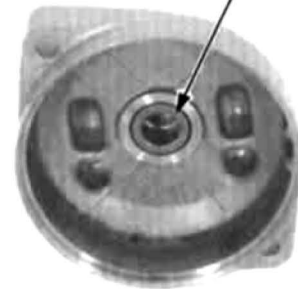
ARMATURE



INSPECTION

Check the bushing in the rear cover for wear or damage.

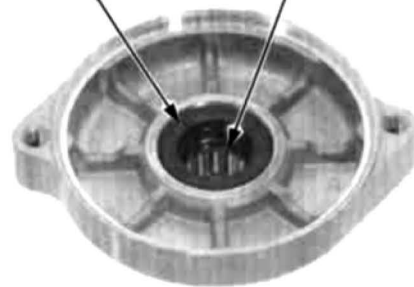
BUSHING



Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.

OIL SEAL

NEEDLE BEARING



*Do not use emery
or sand paper on
the commutator.*

Check the commutator bars of the armature for discoloration.

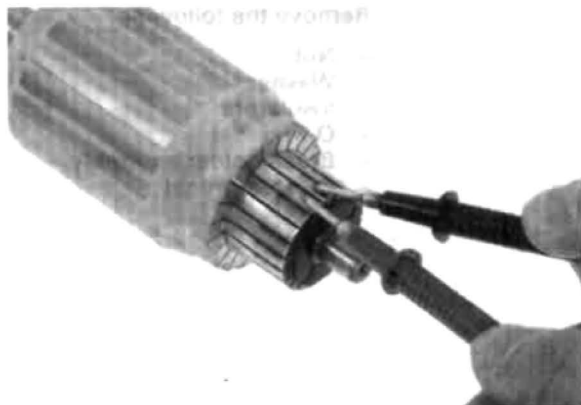
ARMATURE

COMMUTATOR BARS



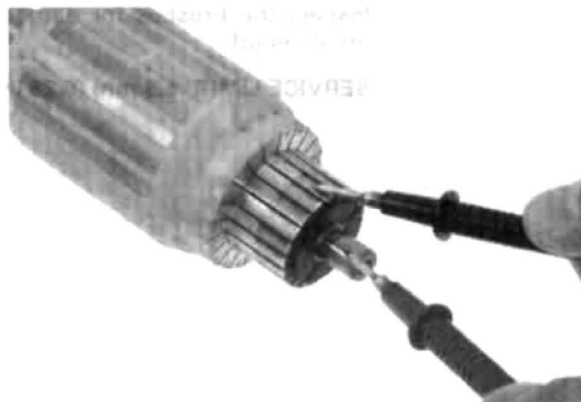
Check for continuity between pairs of commutator bars.

There should be continuity.



Check for continuity between each commutator bar and the armature shaft.

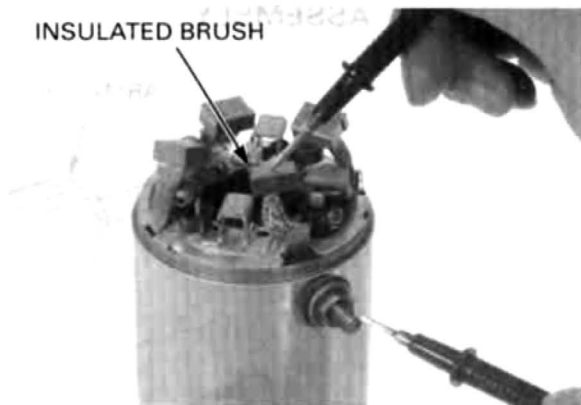
There should be no continuity.



Check for continuity between the insulated brush and cable terminal (the indigo colored wire or the insulated brush holder).

There should be continuity.

INSULATED BRUSH



Check for continuity between the cable terminal and the rear cover.

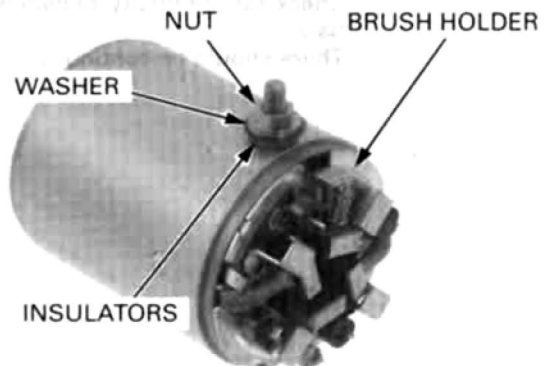
There should be no continuity.



ELECTRIC STARTER

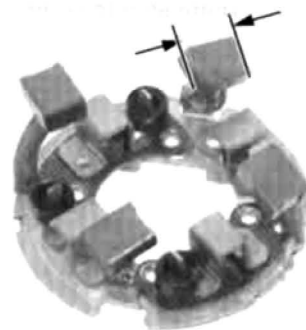
Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal

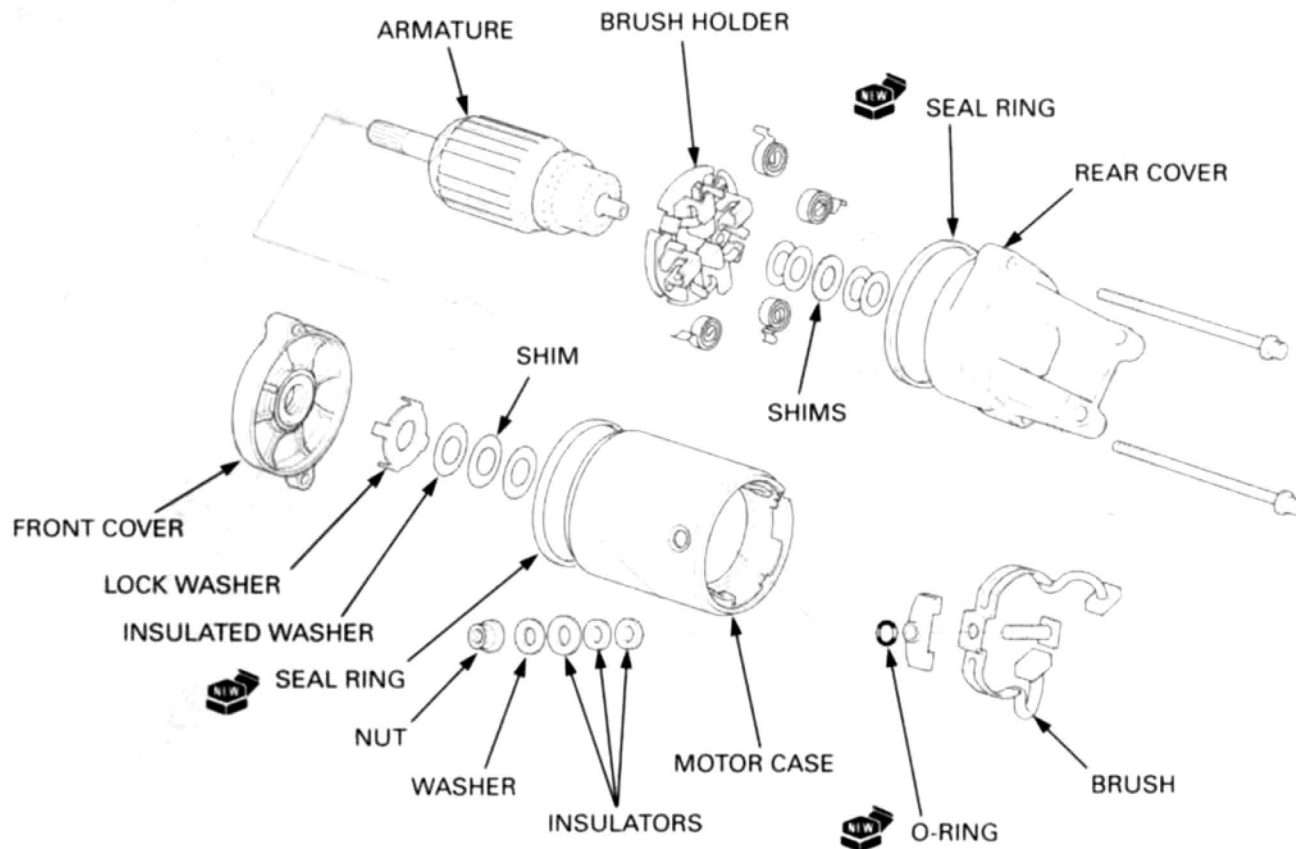


Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)



ASSEMBLY



Install the terminal bolt and insulator to the brush holder.

INSULATOR

TERMINAL BOLT

Install the brushes into the brush holder.

BRUSH HOLDER

ALIGN

Install the cable terminal and brush holder into the rear cover, aligning the holder tab with the rear cover groove.

Install the following:

- New O-ring
- Insulated washers
- Washer
- Nut

INSULATORS

O-RING

NUT

WASHER

Install the armature in the motor case.

When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

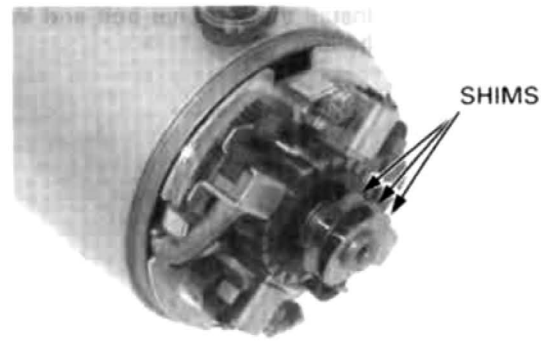
MOTOR CASE

ARMATURE

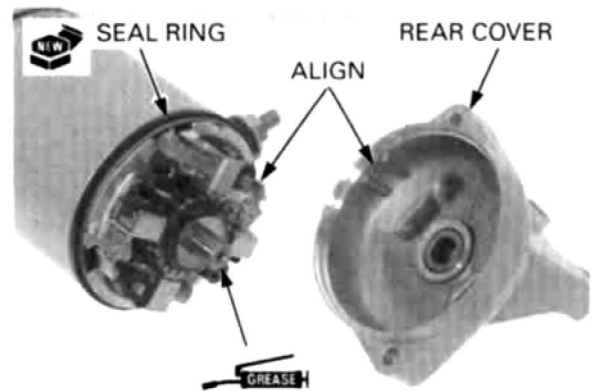
ELECTRIC STARTER

Install the shims properly as noted during removal.

Install the same number of shims in the same location as noted during disassembly.

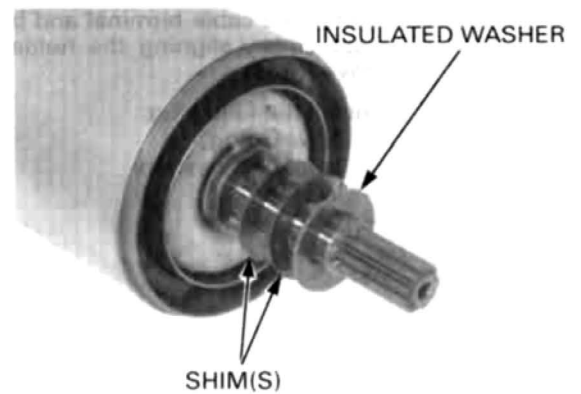


Install a new seal ring onto the motor case.
Apply thin coat of grease to the armature shaft end.
Install the rear cover, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.



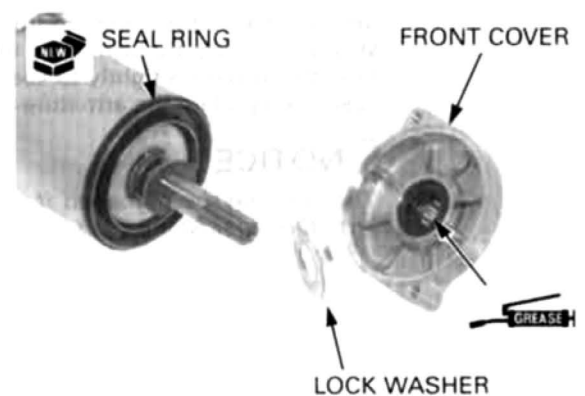
Install the shims properly as noted during removal.

Install the shims and insulated washer onto the armature shaft.

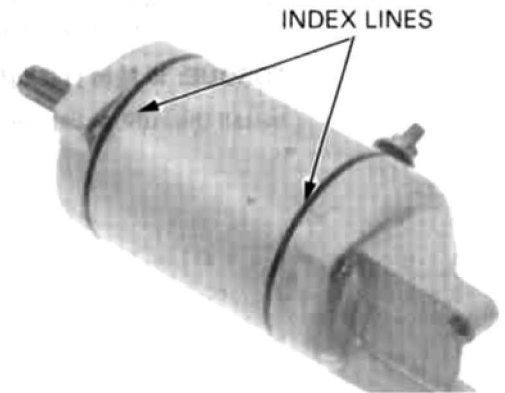


Install a new seal ring onto the motor case.
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.
Install the front cover.



Make sure the index lines on the motor case and covers are aligned.



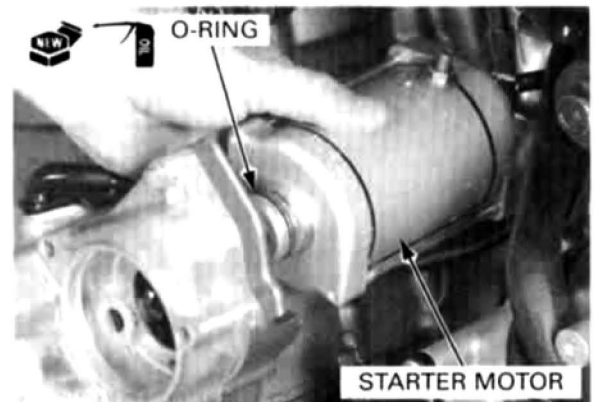
Install and tighten the case bolts securely.



INSTALLATION

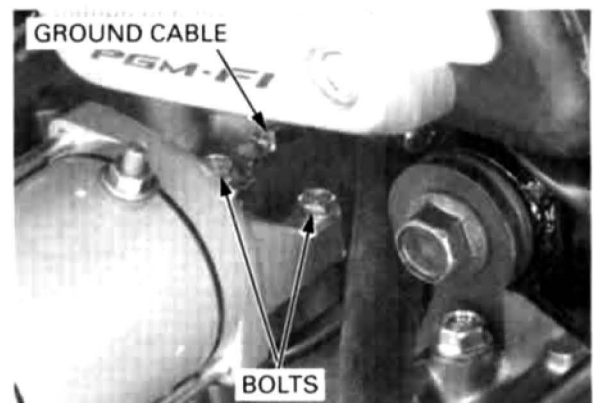
Coat a new O-ring with oil and install it into the starter motor groove.

Install the starter motor into the crankcase.



Route the starter motor cable and ground cable.

Install the ground cable and mounting bolts, and tighten the bolts securely.

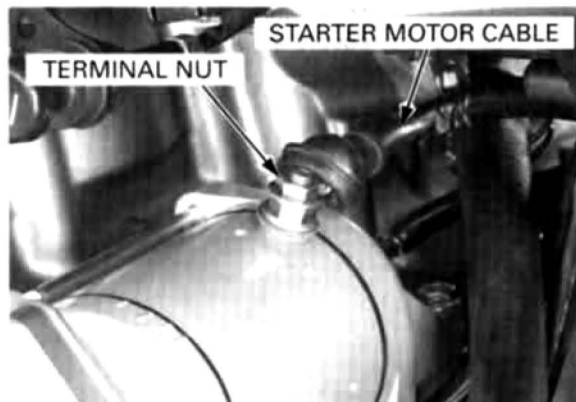


ELECTRIC STARTER

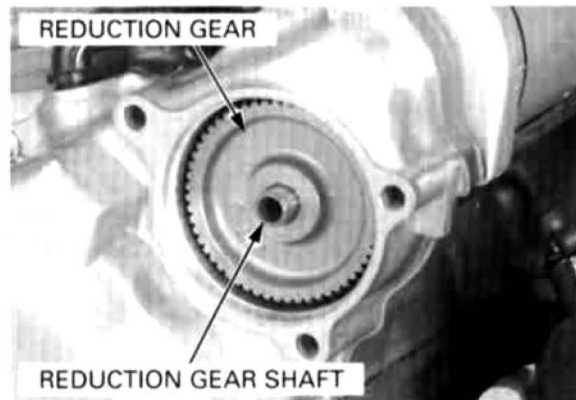
Install the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

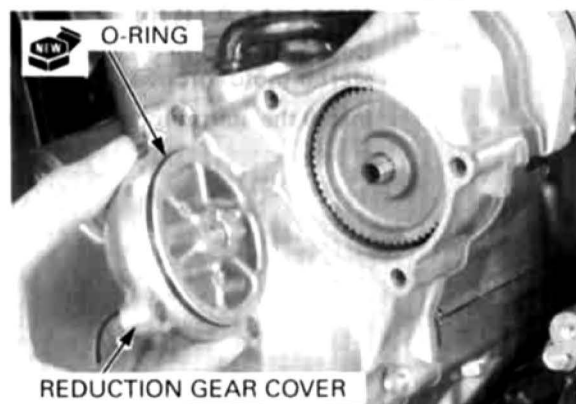
Install the rubber cap securely.



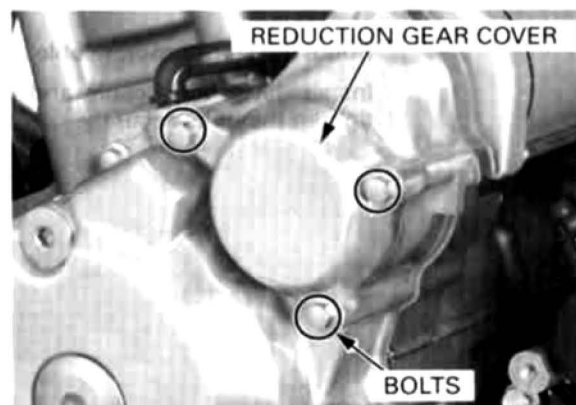
Install the starter reduction gear and shaft.



Install the new O-ring into the groove of the starter reduction gear cover.



Install the starter reduction gear cover onto the alternator cover and tighten the bolts.



STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the left side cover (page 3-4).

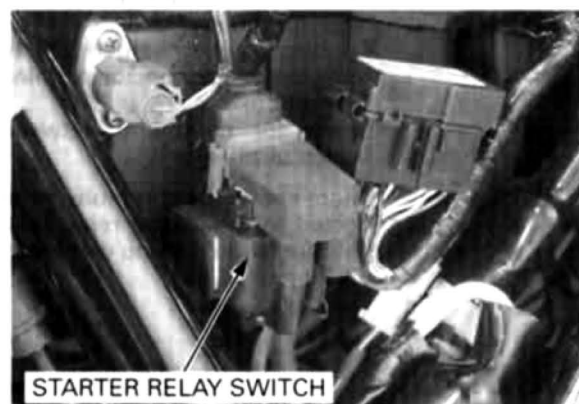
Shift the transmission into neutral.

Turn the ignition switch ON and engine stop switch to RUN.

Turn the ignition switch ON and engine stop switch to RUN.

The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.

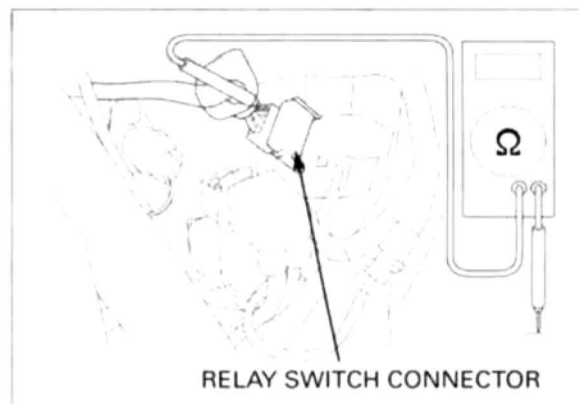


GROUND LINE INSPECTION

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green/Red wire (ground line) and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is retracted, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).



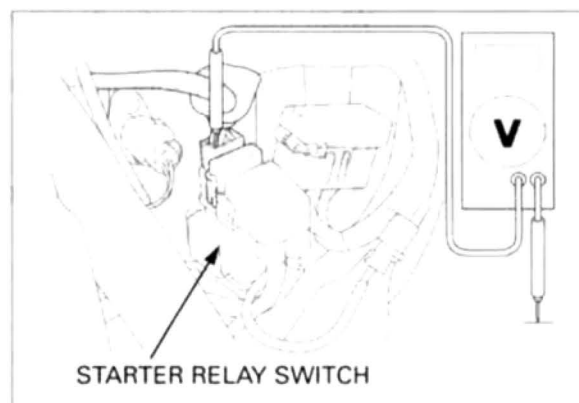
STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch 4P connector.

Shift the transmission into neutral.

Measure the voltage between the Yellow/Red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch at RUN, it is normal.



CONTINUITY INSPECTION

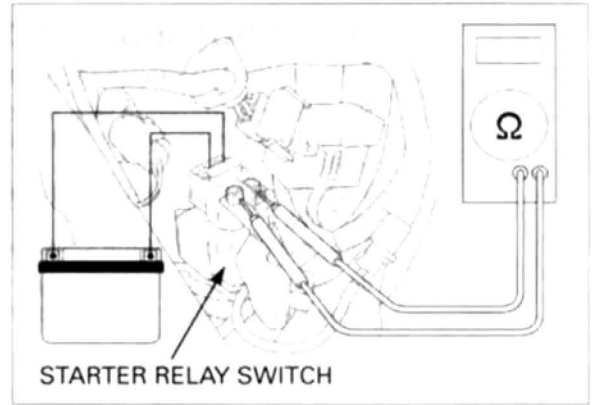
Disconnect the starter relay connector and cables.

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12V battery to the starter relay switch connector terminals (Yellow/Red and Green/Red).

Check for continuity between the starter relay switch terminals.

There should be continuity while 12V battery is connected to the starter relay switch connector terminals and should be no continuity when the battery is disconnected.

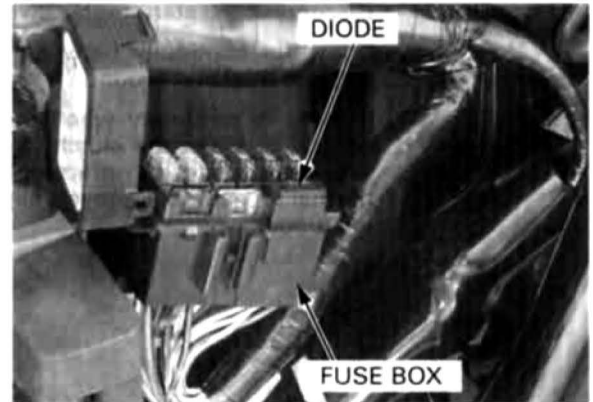


DIODE

REMOVAL

Remove the left side cover (page 3-4).

Open the fuse box and remove the diode.



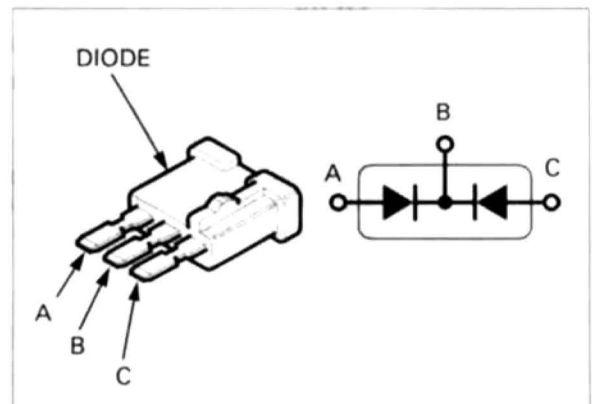
INSPECTION

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity, in one direction, the diode is normal.

INSTALLATION

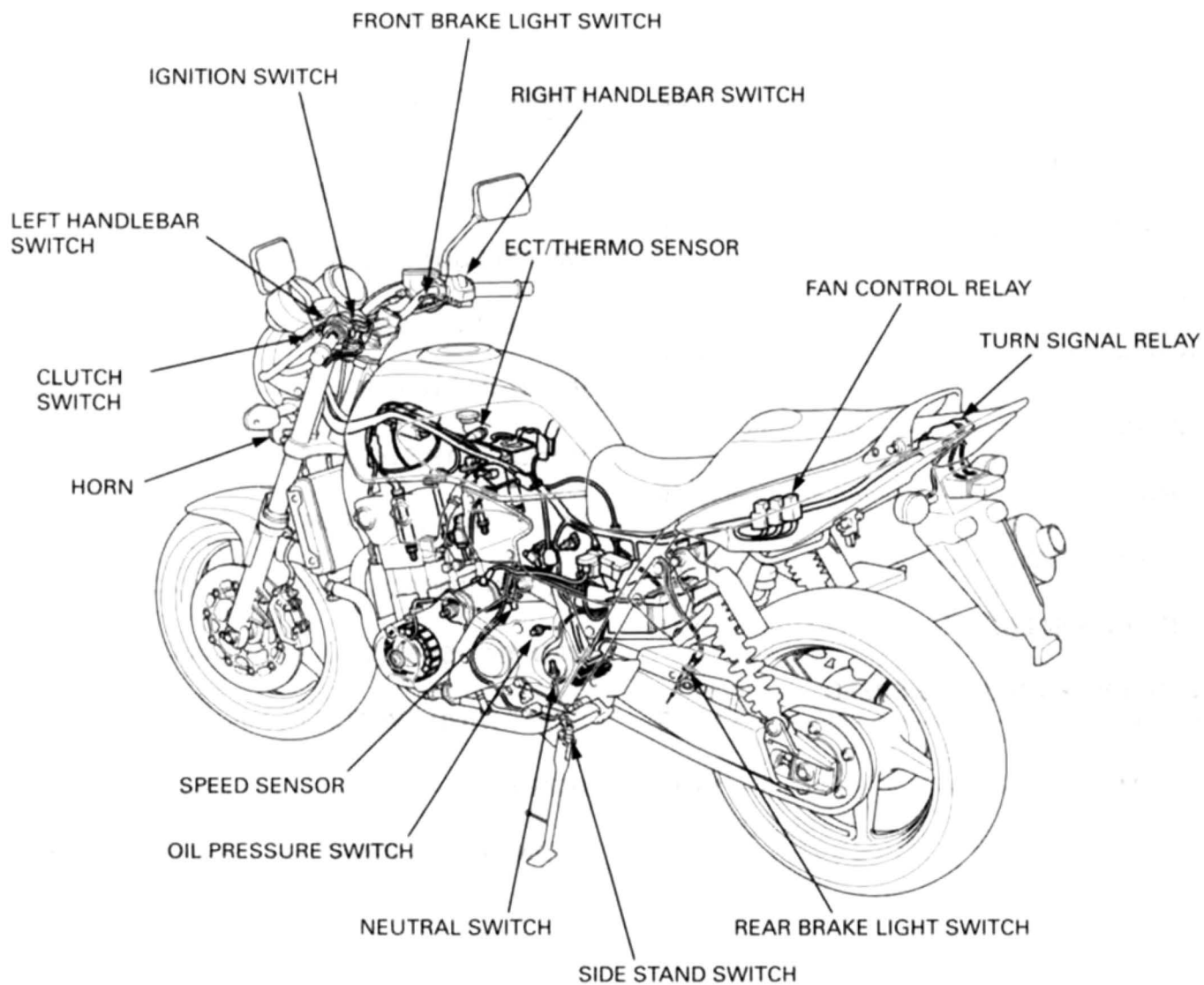
Install the diode in the reverse order of removal.



19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION.....	19-2	COOLANT TEMPERATURE GAUGE/ SENSOR.....	19-19
SERVICE INFORMATION	19-3	COOLING FAN MOTOR RELAY	19-20
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TURN SIGNAL	19-9	HANDLEBAR SWITCHES	19-24
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SYSTEM LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF.

Be sure to let it cool down before servicing.

- Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bu = Blue
Bl = Black
Br = Brown

G = Green
Gr = Gray
Lb = Light Blue

Lg = Light Green
O = Orange
P = Pink

R = Red
W = White
Y = Yellow

SPECIFICATIONS

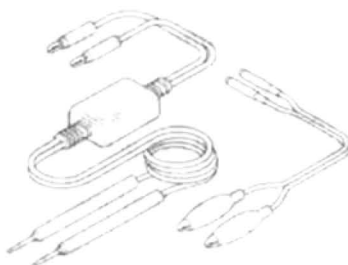
ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 60 W
		Lo	12V – 55 W
	Position light (except U type)		12V – 5 W
	Brake/tail light		LED (5.7 W/0.8 W)
	Turn signal light		12V – 21 W X 4
	License light		12V – 5 W
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Temperature indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Immobilizer indicator		LED
Fuse	Main fuse		30 A
	Sub fuse		20 A X 2, 10 A X 4
Tachometer peak voltage			10.5 V minimum
Engine coolant temperature resistance		80°C (68°F)	47.5 – 56.8 kΩ
		120°C (248°F)	14.9 – 17.3 kΩ

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal bolt/washer	2 N·m (0.22 kgf·m, 1.6 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt; replace with a new one
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Coolant temperature/ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	

TOOL

Peak voltage adaptor
07HGJ-0020100



with commercially available digital
multimeter (impedance 10 M Ω DCV
minimum)

TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate
Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate
Faulty odometer/trip meter

The speedometer operate is abnormal

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Did the fuse blow?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition.

Is the battery in good condition?

YES – Replace the fuse

NO – GO TO STEP 3.

3. Speed Sensor Power Input Voltage Inspection (Speed Sensor Side)

Check for loose or poor contact of the speed sensor 3P (Natural) connector.

With the ignition switch ON and measure the voltage at the speed sensor connector.

Is there Battery Voltage?

NO – • Loose or poor contact of related terminals
• Open circuit in Black/Brown or Green/Black wires between the battery and speed sensor

YES – GO TO STEP 4.

4. Speed Sensor Power Input Voltage Inspection (Combination Meter Side)

Check for loose or poor contact of the combination meter multi-connectors.

With the ignition switch ON and measure the voltage at bottom of the speedometer terminals.

Is there Battery Voltage?

NO – • Loose or poor contact of related terminals
• Open circuit in Black/Brown or Green/Black wires between the battery and speed sensor

YES – GO TO STEP 5.

5. Speed Sensor Signal Line Inspection

With the ignition switch OFF, check for continuity of the Pink/Green wire between the terminals of the speed sensor and speedometer.

Is there continuity?

NO – Open circuit in Pink/Green wire

YES – GO TO STEP 6.

6. Speed Sensor Signal Inspection

Support the motorcycle using a hoist or other support to rise the rear wheel off the ground.

Measure the output voltage (sensor signal) at the speedometer with the ignition switch is ON while slowly turning the rear wheel by your hand.

CONNECTION: Pink (+) – Green (-)

STANDARD: Repeat 0 to 5 V

Is the voltage as specified?

NO – • Faulty speed sensor
• Loose speed sensor mounting bolts

YES – Faulty speedometer

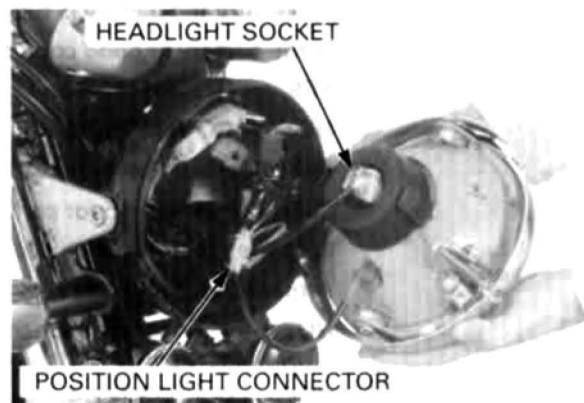
HEADLIGHT

HEADLIGHT UNIT REMOVAL

Remove the headlight unit mounting screws and headlight unit from the headlight case.

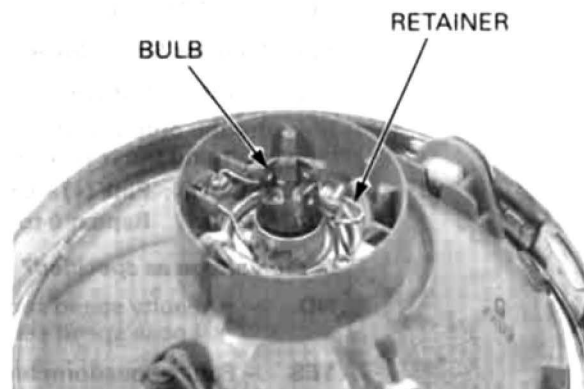
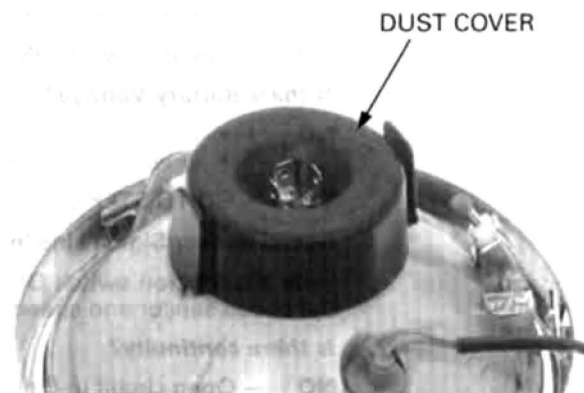


Disconnect the headlight socket and position light 2P (Natural) connector.



BULB REPLACEMENT

Remove the dust cover.

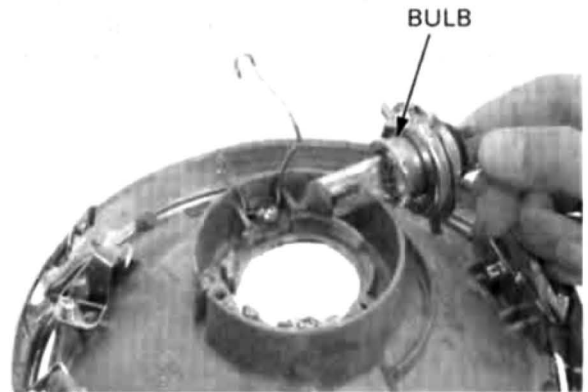


Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

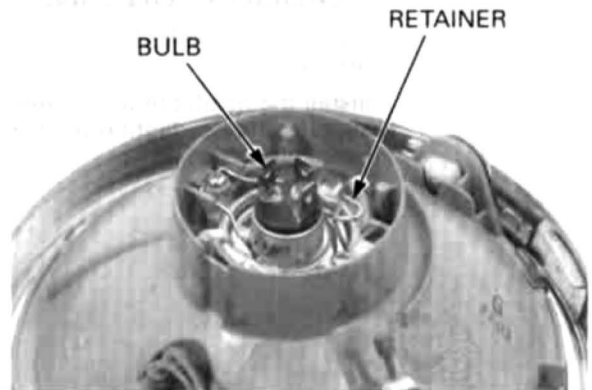
Unhook the bulb retainer and remove the headlight bulb/socket.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

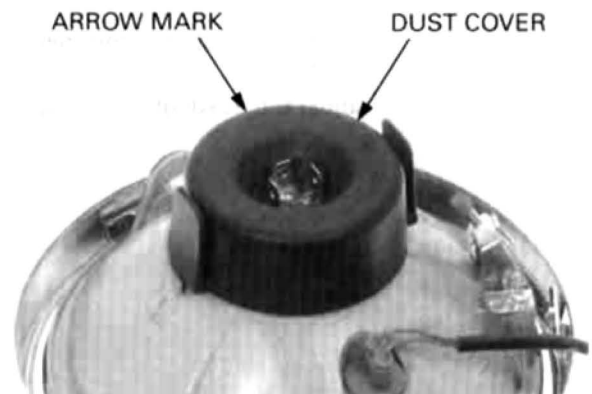
Install the new headlight bulb aligning its tabs with the groove in the headlight unit.



Hook the bulb retainer into the headlight unit groove.



Install the dust cover tightly against the headlight unit with its arrow mark facing up.



HEADLIGHT CASE REMOVAL/INSTALLATION

Remove the headlight unit (page 19-6).

Release the wire harness from the harness clamps.



LIGHTS/METERS/SWITCHES

Route the wire harness properly (page 1-23).

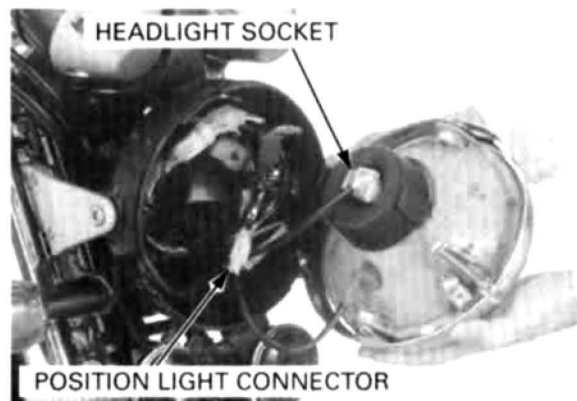
Remove the headlight case mounting bolt and nut, then remove the headlight case from the stay. Installation is in the reverse order of removal.



HEADLIGHT UNIT INSTALLATION

Connect the headlight socket and position light connector.

Install the headlight unit to the headlight case while aligning the headlight rim tab with the groove in the headlight case.



Install and tighten the headlight unit mounting screws.

Adjust the headlight aim (page 4-27).

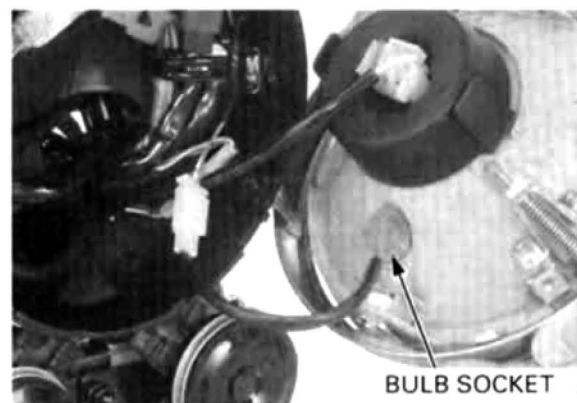


POSITION LIGHT

BULB REPLACEMENT

Remove the headlight unit (page 19-6).

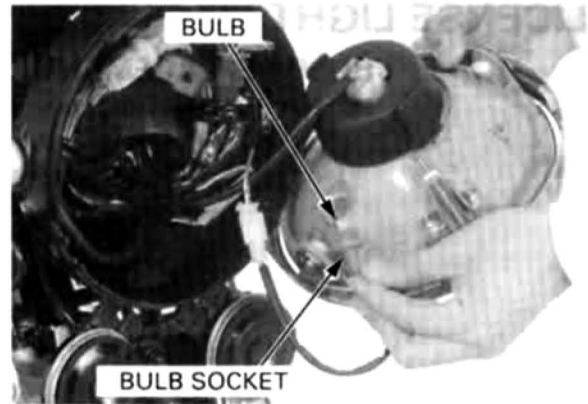
Pull out the position light bulb socket.



Remove the bulb from the socket, replace it with a new one.

Install the position light bulb socket.

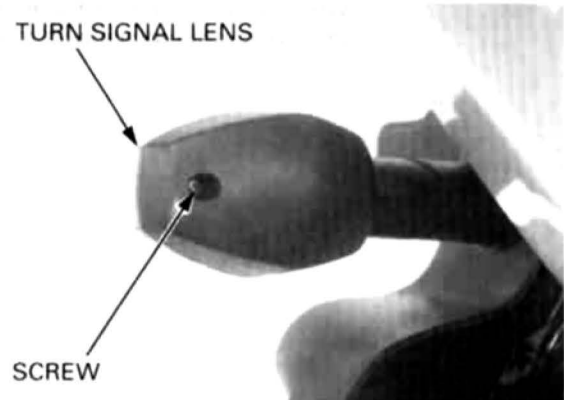
Install the headlight unit (page 19-8).



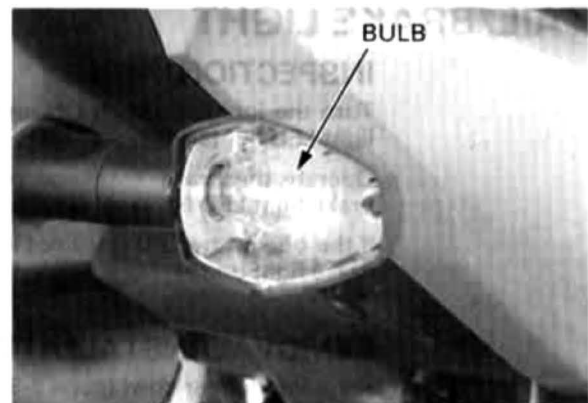
TURN SIGNAL

BULB REPLACEMENT

Remove the screw, turn signal lens and gasket.



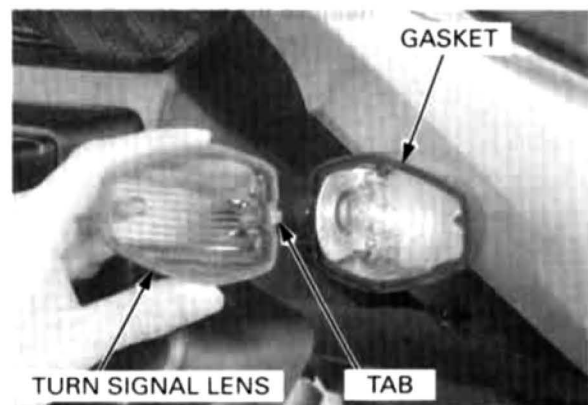
While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.



Check the turn signal lens gasket is in good condition, replace if necessary.

Install the turn signal lens while aligning its tab with the groove in the turn signal unit.

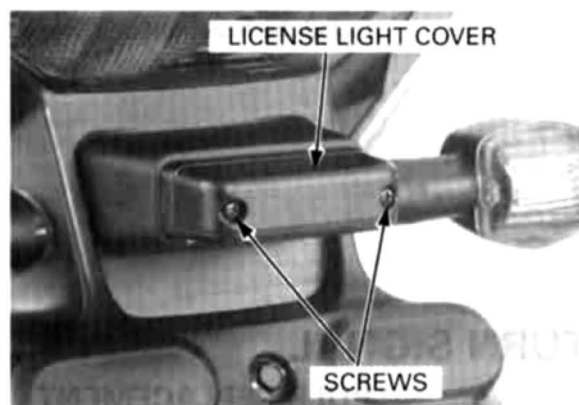
Install and tighten the screw securely.



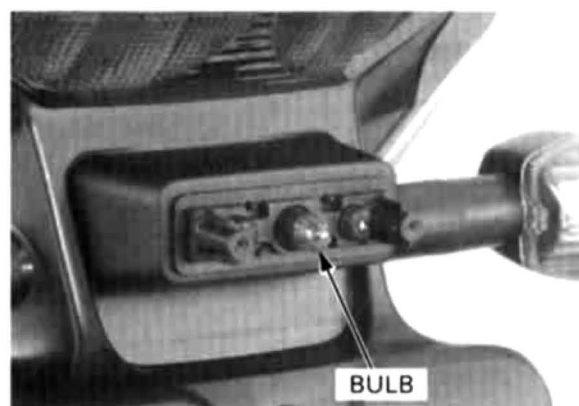
LICENSE LIGHT

BULB REPLACEMENT

Remove the screws and license light cover.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.



TAIL/BRAKE LIGHT

INSPECTION

Turn the ignition switch ON and check that the tail light LED lights all.

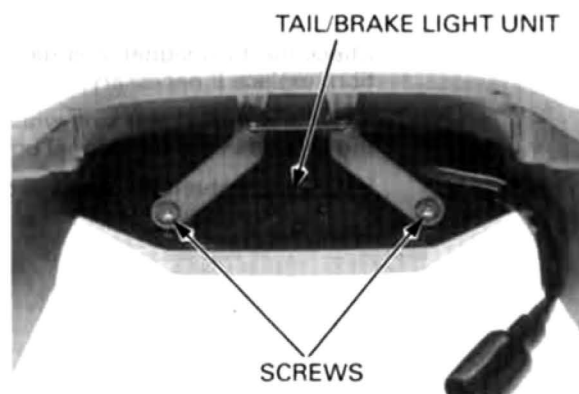
Operate the brake lever and pedal, check that the brake light LED lights all.

If the one of the LED does not light, replace the tail/brake light unit.

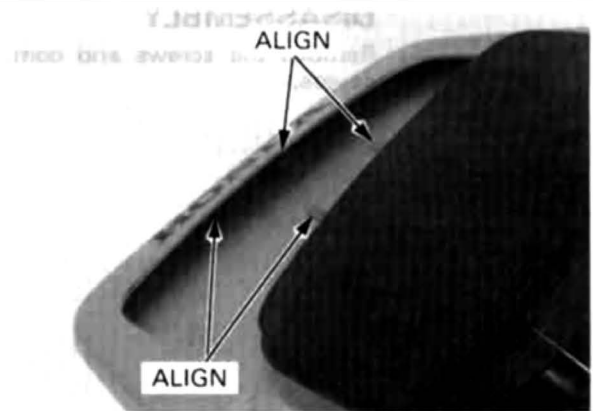
REMOVAL/INSTALLATION

Remove the rear cowl (page 3-5).

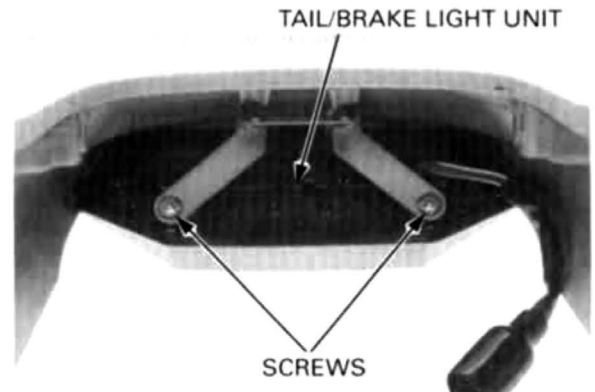
Remove the two screws and tail/brake light unit.



Install the tail/brake light unit into the rear cowl.



Install and tighten the tail/brake light unit mounting screws.

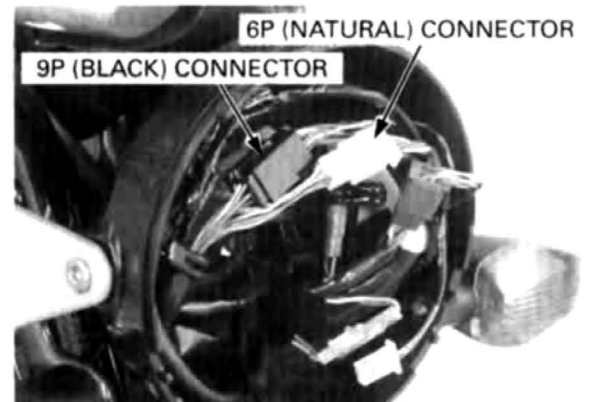


COMBINATION METER

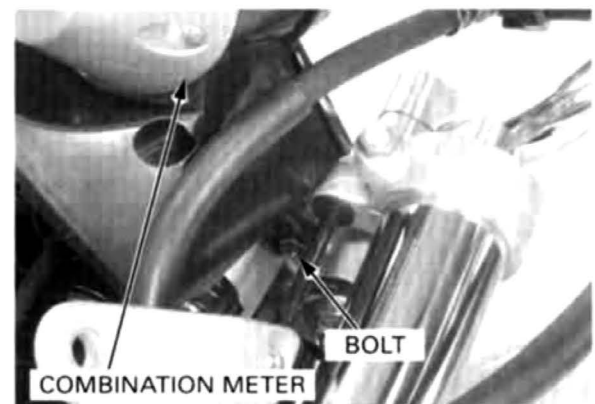
REMOVAL

Remove the headlight unit (page 19-6).

Disconnect the combination meter 9P (Black) and 6P (Natural) connectors.

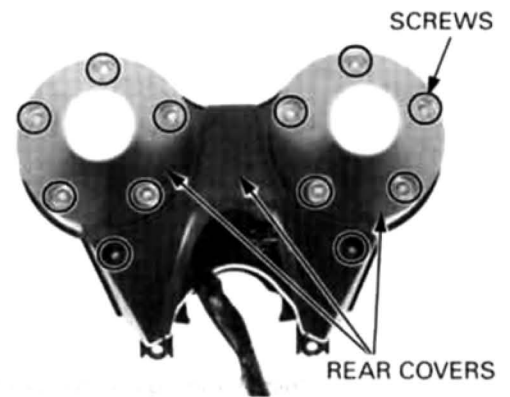


Remove the combination meter mounting bolts and combination meter.

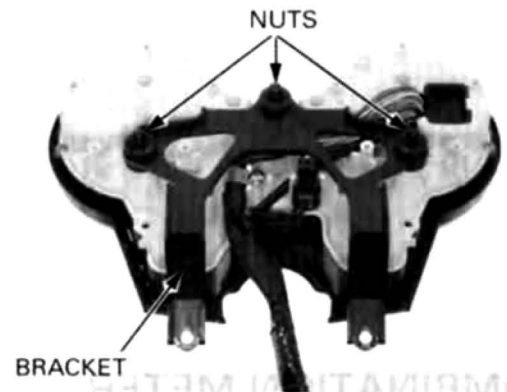


DISASSEMBLY

Remove the screws and combination meter rear covers.



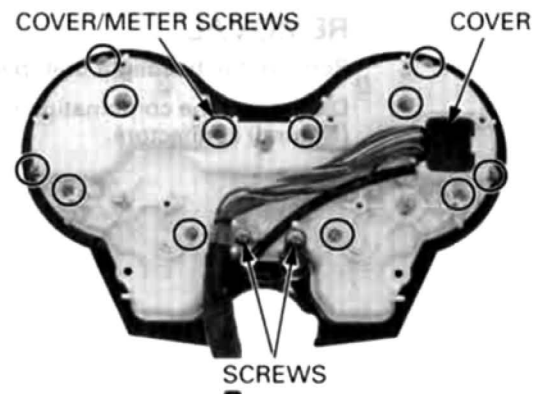
Remove the nuts and combination meter bracket.



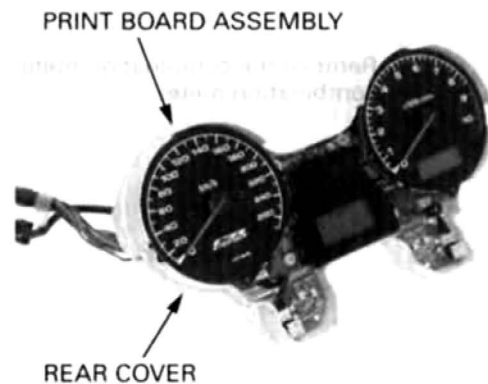
Remove the meter sub-harness clamp screw and open air temperature sensor screw.

Remove the harness cover.

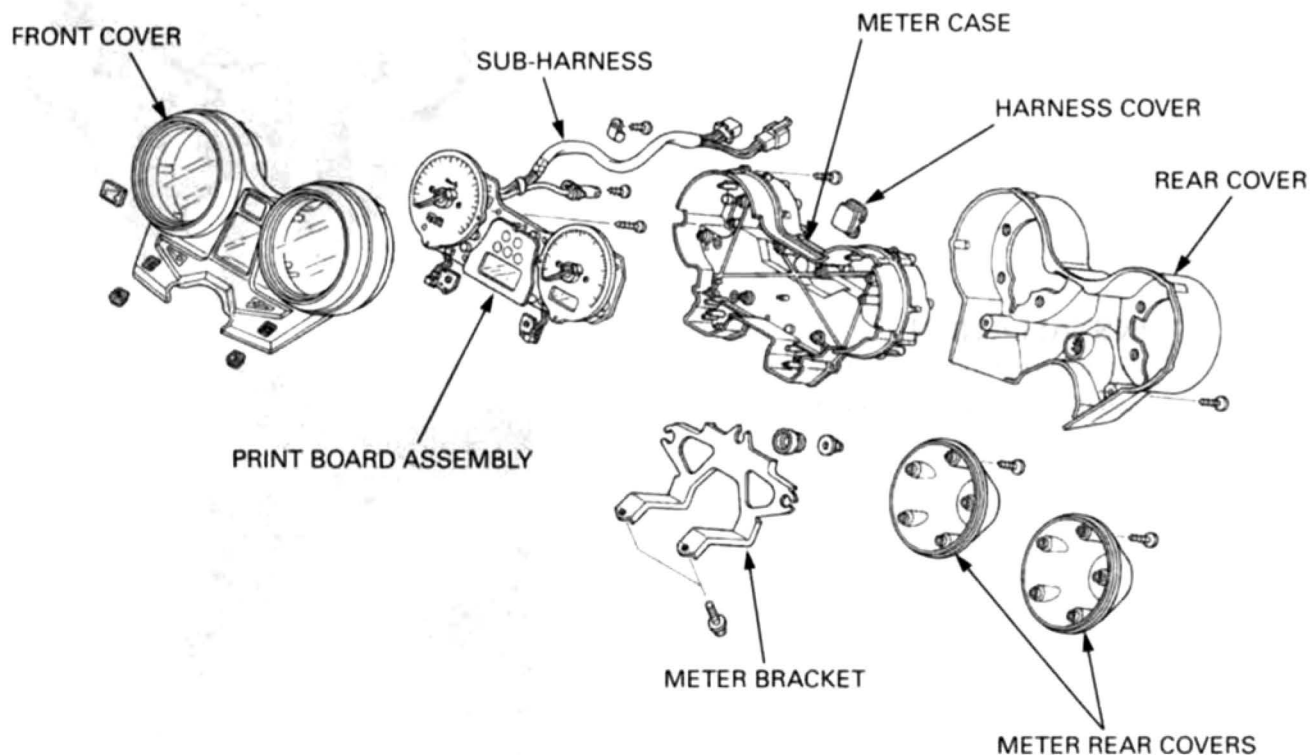
Remove the front cover mounting screws and meter mounting screws, then remove the combination meter front cover.



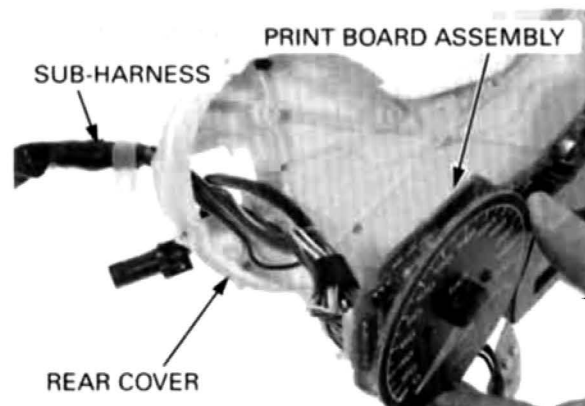
Remove the combination meter print board assembly from the rear cover.



ASSEMBLY

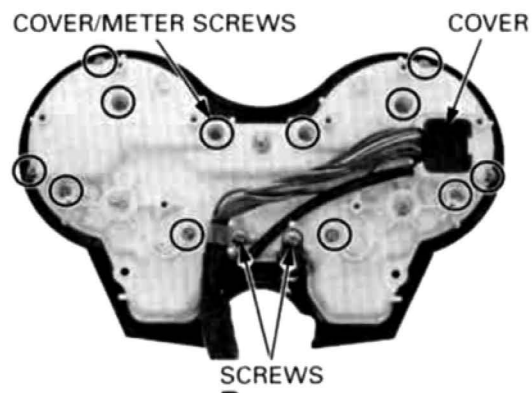


Route the meter sub-harness into the rear cover, then install the print board assembly into the rear cover.

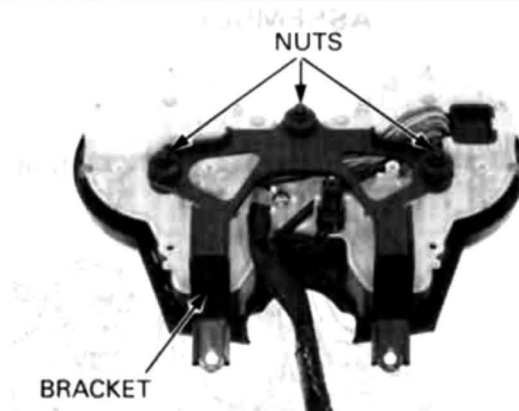


Install the front cover, then install and tighten the meter mounting screws and front cover mounting screws.
Install the harness cover.

Install the meter sub-harness clamp and open air temperature sensor, tighten the screws.

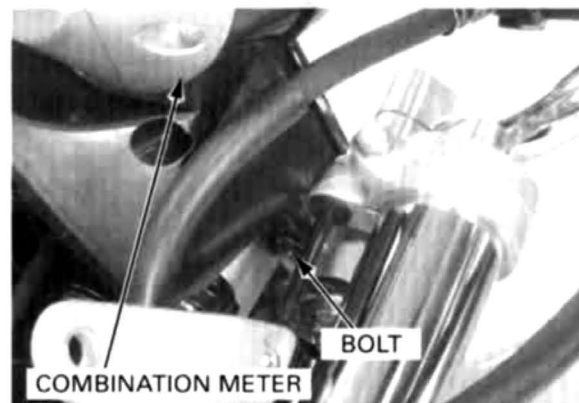


Install the combination meter bracket and tighten the nuts.



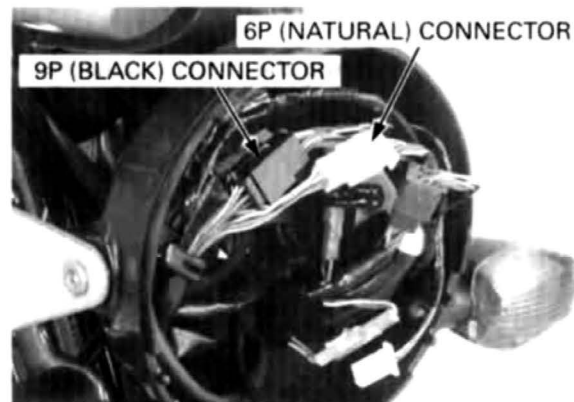
INSTALLATION

Install the combination meter onto the top bridge.
Install and tighten the mounting bolts.



Connect the combination meter 9P (Natural) and 9P (Black) connectors.

Install the headlight unit (page 19-8).



POWER/GROUND LINE INSPECTION

Disconnect the combination meter combination meter 6P (Natural) and 9P (Black) connectors. Check the following at the wire harness side connector terminals of the combination meter.

Power input line

Measure the voltage between the Black/Brown wire terminal (+) and Ground (-).

There should be battery voltage with the ignition switch ON.

If there is no voltage, check for open circuit in Black/Brown wire.

Back-up voltage line

Measure the voltage between the Red/Green wire terminal (+) and Ground (-).

There should be battery voltage at all times.

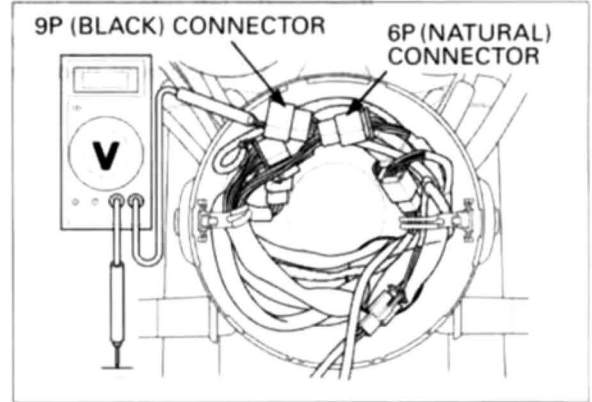
If there is no voltage, check for open circuit in Red/Green wire.

Sensor ground line

Measure the voltage between the Green/Black wire terminal (+) and Ground (-).

There should be battery voltage at all times.

If there is no voltage, check for open circuit in Green/Black wire.

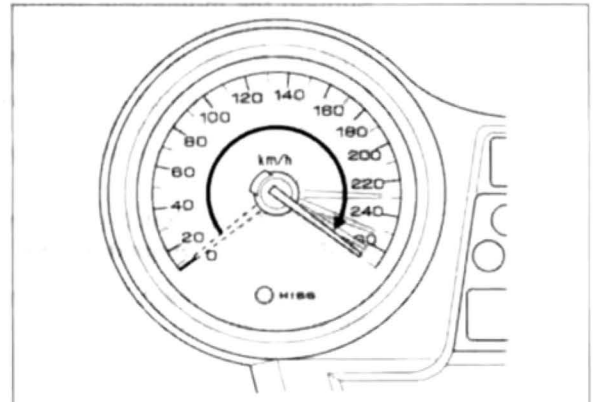


SPEEDOMETER/VEHICLE SPEED SENSOR

SYSTEM INSPECTION

When the ignition switch turns ON, check that the Speedometer needle move to full scale and then return to zero.

If the needle does not show initial function, check for combination meter power input line (page 19-15).



Check that the tachometer and coolant temperature meter function properly.

- If they do not function, perform the power and ground line inspection of the combination meter (page 19-15).

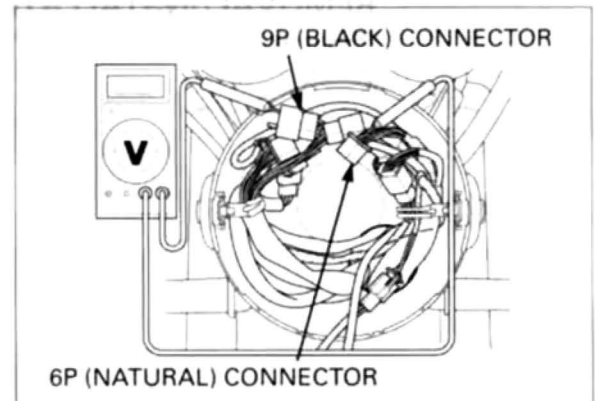
- If they function, shift the transmission into neutral, disconnect the combination meter combination meter 9P (Black) and 6P (Natural) connectors and turn the ignition switch ON.

Measure the voltage between the Pink/Green (+) and Green/Black (-) wire terminals of the wire harness side connector.

Slowly turn the rear wheel by hand.

There should be 0 to 5 V pulse voltage.

- If pulse voltage appears, replace the combination meter print circuit board.
 - If pulse voltage does not appear, check for open or short circuit in Pink/Green wire.
- If the Pink/Green wire is OK, check for the speed sensor (page 19-16).



SPEED SENSOR INSPECTION

Remove the left side cover (page 3-4).

Disconnect the speed sensor 3P (Natural) connector and check for loose or poor contact of the connector.

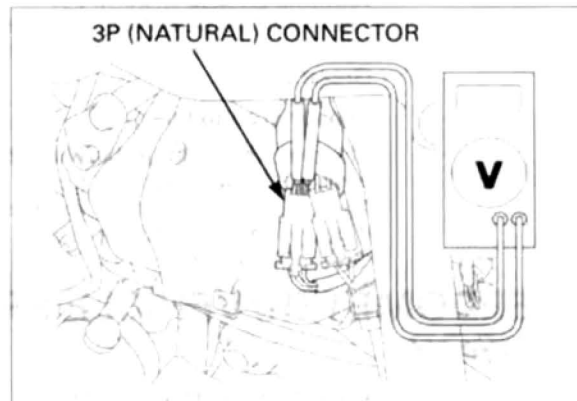


Connect the speed sensor 3P (Natural) connector.

Turn the ignition switch is ON and measure the voltage at the 3P (Natural) connector with the connector connected.

CONNECTION: Black/Brown (+) – Green/Black (–)
STANDARD: Battery voltage

If there is no voltage, check for open circuit in Black and Green wire and loosen contact of the wire harness connectors.



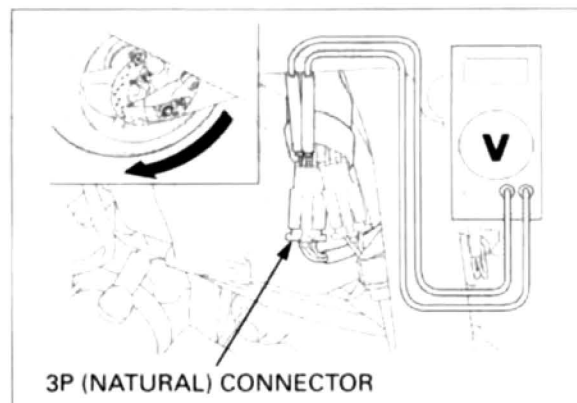
Support the motorcycle securely and place the rear wheel off the ground.

Shift the transmission into neutral.

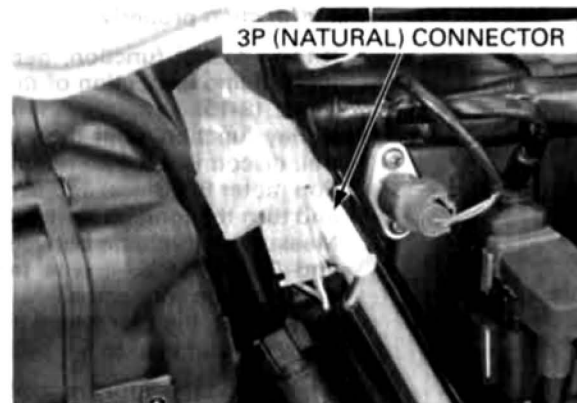
Measure the voltage at the sensor connector terminals with the ignition switch is ON and engine stop switch is RUN while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green (–)
STANDARD: Repeat 0 to 5V

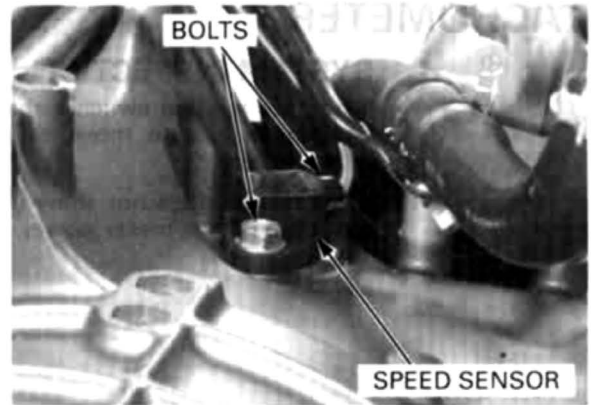
If the measurement is out of specification, replace the speed sensor.

**REMOVAL/INSTALLATION**

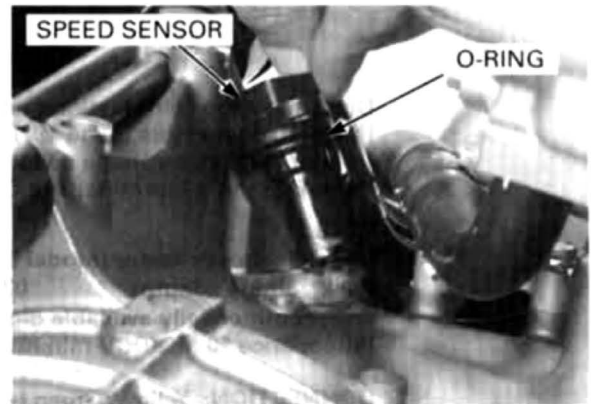
Disconnect the speed sensor 3P (Natural) connector.



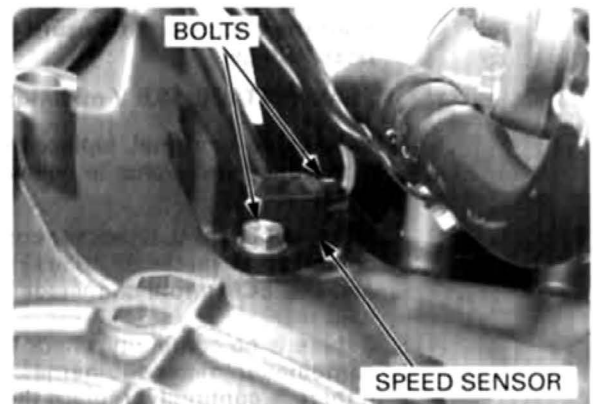
Disconnect the speed sensor 3P (Natural) connector.
Remove the bolts and speed sensor.



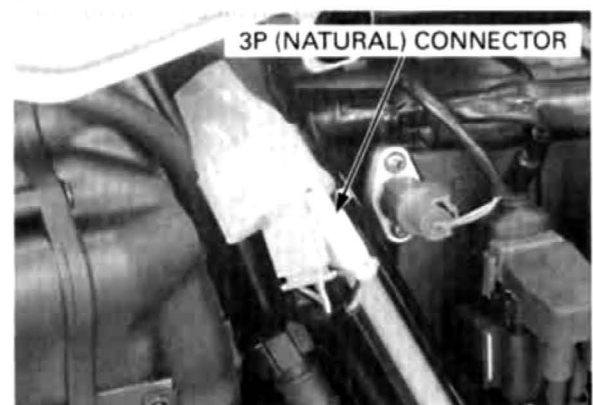
Check the O-ring is in good condition, replace if necessary.
Install the speed sensor into the upper crankcase.



Install and tighten the mounting bolts securely.
Route the sensor wire.



Connect the speed sensor 3P (Natural) connector.

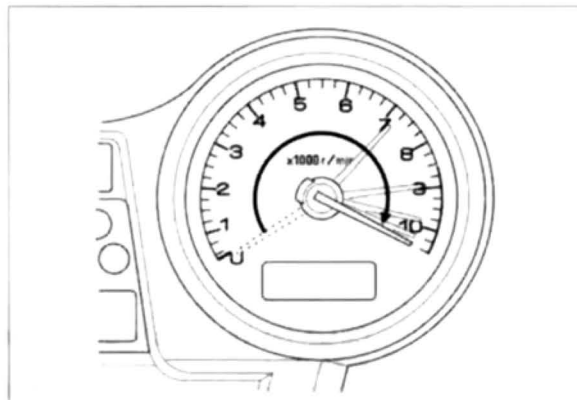


TACHOMETER

SYSTEM INSPECTION

When the ignition switch turns ON, check that the tachometer needle move to full scale and then return to zero.

If the needle does not show initial function, check for combination meter power input line (page 19-15).



Disconnect the combination meter 9P (Black) and 6P (Natural) connectors (page 19-15).

Connect the peak voltage adaptor to the tachometer Yellow/Green (+) terminal and Green (-).

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION: Yellow/Green (+) and Green (-)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

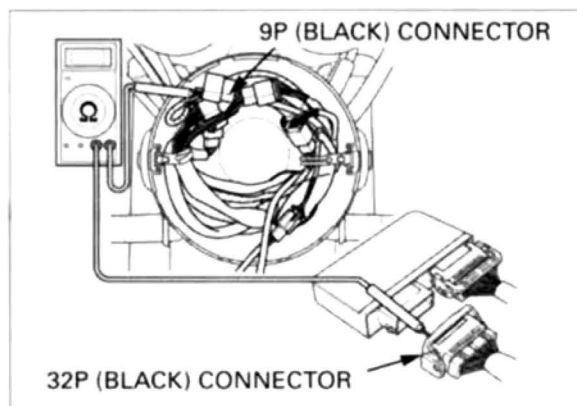
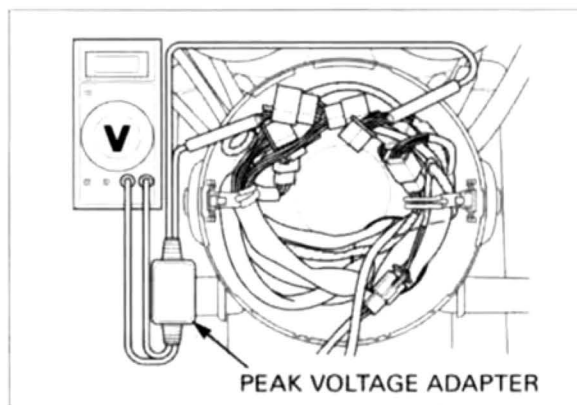
If the value is normal, replace the tachometer.

If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, check for continuity between the combination meter 9P (Black) connectors terminal and the ECM multi-connector Yellow/Green terminals.

If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.

If there is continuity, replace the combination meter printed circuit board (page 19-11).



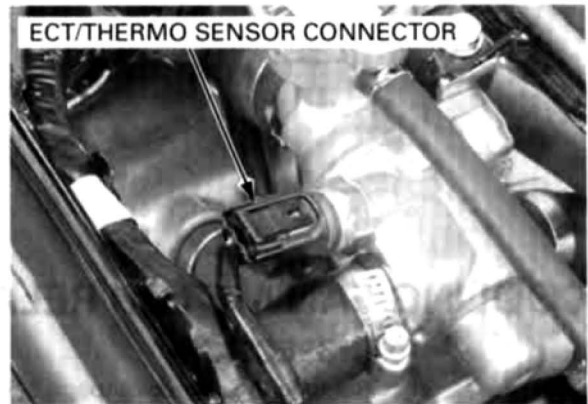
COOLANT TEMPERATURE GAUGE/ SENSOR

REMOVAL

Open and support the front end of fuel tank (page 4-5).

Drain the coolant (page 7-6).

Disconnect the wire connector from the ECT/thermo sensor and remove the sensor.



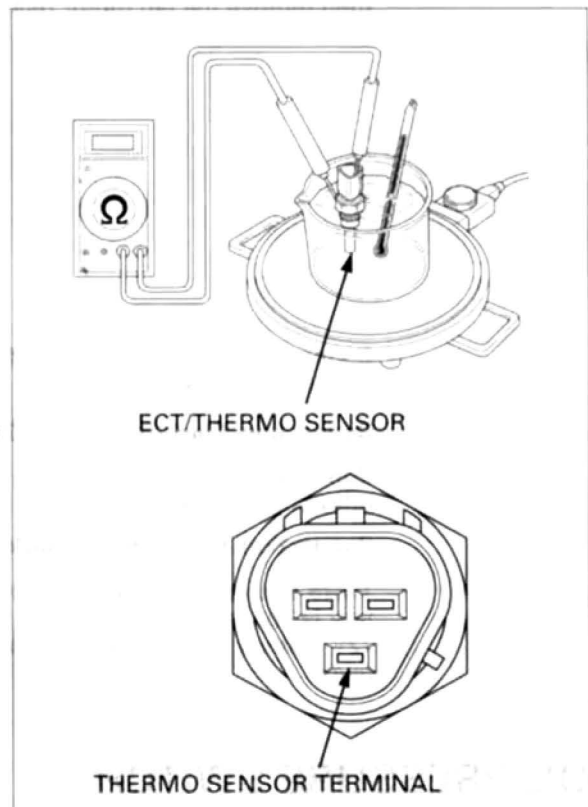
THERMO SENSOR UNIT INSPECTION

Suspend the ECT/thermo sensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT/thermo sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT/thermo sensor touch the pan.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	80°C (68°F)	120°C (248°F)
Resistance	47.5 – 56.8 kΩ	14.9 – 17.3 kΩ

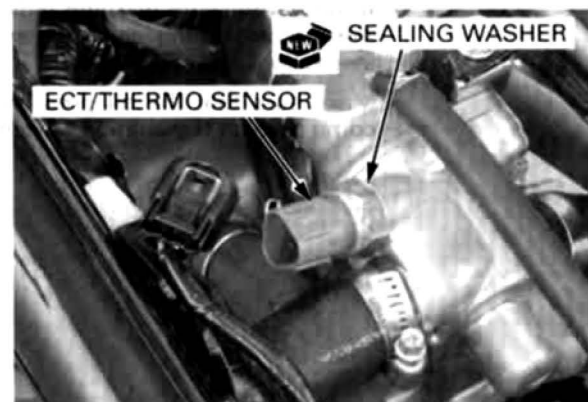


INSTALLTION

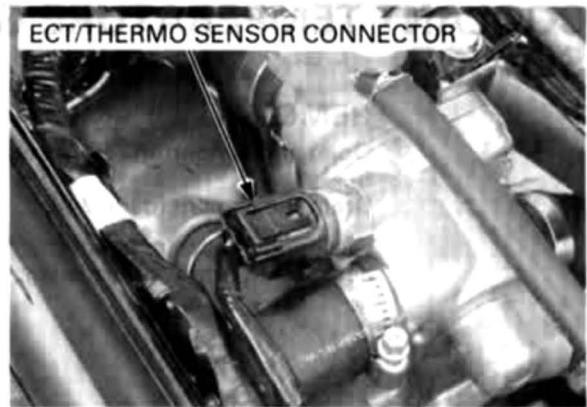
Always replace the sealing washer with a new one.

Install and tighten the ECT/thermo sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Connect the ECT/thermo sensor connector.
Fill the system and bleed the air (page 7-6).

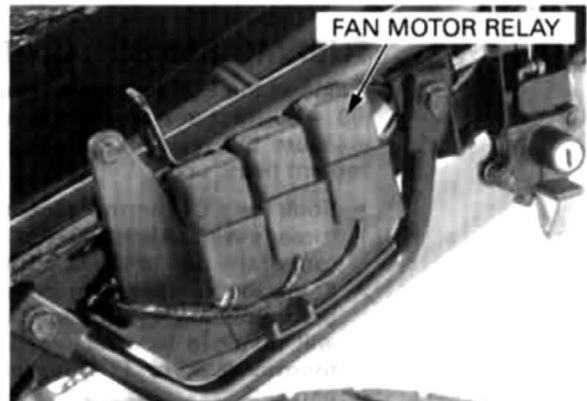


COOLING FAN MOTOR RELAY

INSPECTION

Remove the rear cowl (page 3-5).

Disconnect the fan motor relay 4P (Black) connector, then remove the fan motor relay.



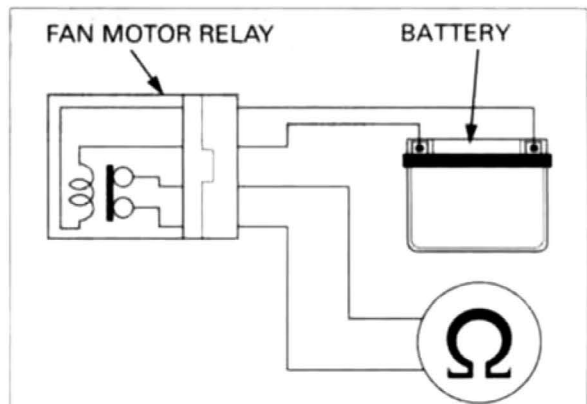
Connect the ohmmeter to the fan motor relay connector terminals.

Connection: Black/Blue – Red/Green

Connect the 12V battery to the following fan motor relay connector terminals.

Connection: Green/Blue – Black/White

There should be continuity only when the 12V battery is connected. If there is no continuity when the 12V battery is connected, replace the fan motor relay.

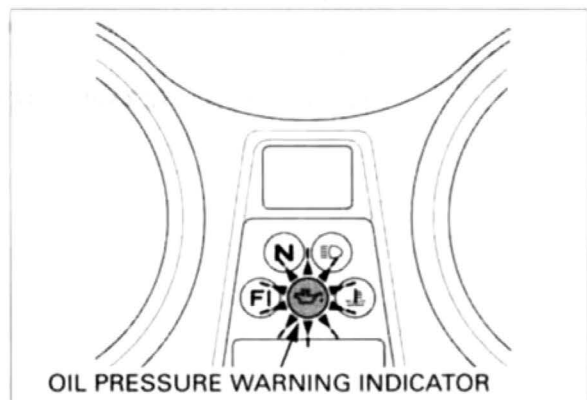


OIL PRESSURE SWITCH

INSPECTION

If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

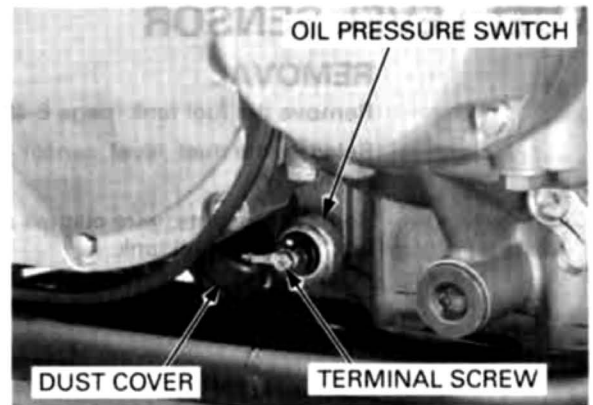
Make sure that the oil pressure warning indicator come on with the ignition switch ON.



If the indicator does not come on, inspect as follow:

Remove the dust cover.

Remove the screw and oil pressure switch terminal.



Short the oil pressure switch wire terminal with the ground using a jumper wire.

The oil pressure warning indicator comes on with the ignition switch is ON.

If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes 0.2out.

If the light does not go out, check the oil pressure (page 5-5).

If the oil pressure is normal, replace the oil pressure switch (page 19-21).



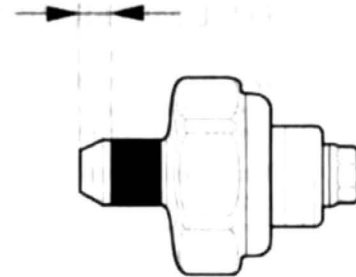
REMOVAL/INSTALLATION

Remove the boot, terminal screw and wire terminal (page 19-21).

Remove the oil pressure switch from the crankcase.

Apply sealant to the oil pressure switch threads as shown.

Do not apply sealant to the thread head 3 – 4 mm (0.1 – 0.2 in).



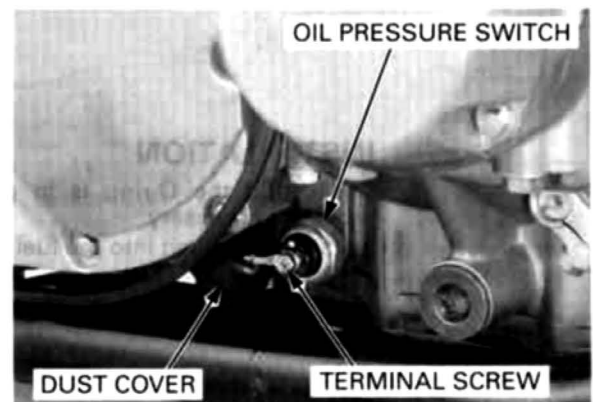
Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the oil pressure switch terminal to the switch and tighten the screw to the specified torque.

TORQUE: 2 N·m (0.22 kgf·m, 1.6 lbf·ft)

Install the dust cover.



FUEL LEVEL SENSOR

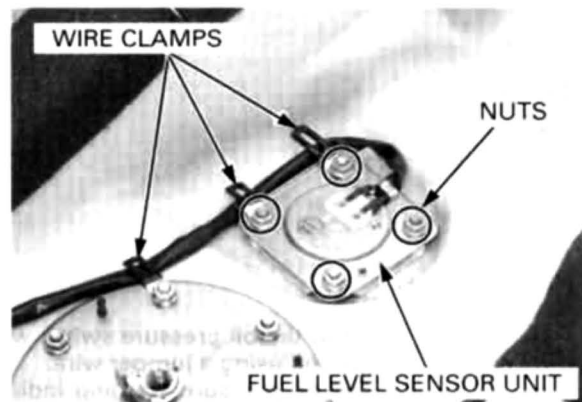
REMOVAL

Remove the fuel tank (page 6-48).

Release the fuel level sensor wire from the wire clamps.

Be careful not to damage the float arm.

Remove the nuts, wire clamps and fuel level sensor unit from the fuel tank.

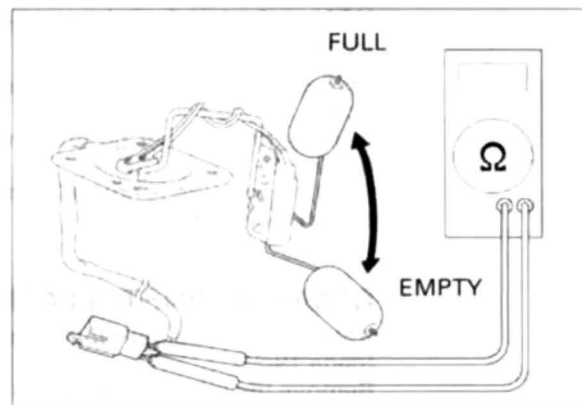


FUEL LEVEL SENSOR INSPECTION

Connect the ohmmeter to the fuel level sensor Gray/black and Green/black terminals.

Inspect the resistance of the float at the top and bottom positions.

	FULL	EMPTY
Resistance	8 – 12 Ω	213 – 219 Ω



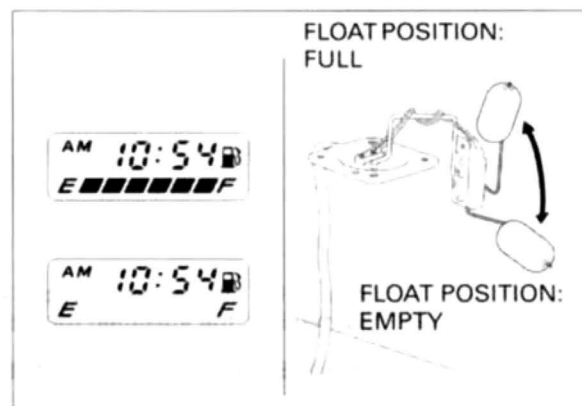
FUEL METER INSPECTION

Connect the fuel sensor 2P (Blue) connector to the wire harness and move the float from empty to full to check the fuel meter display indication. (in 10 – 11 seconds, 1 segment change)

Turn the ignition switch to "ON".

If the fuel meter does not indicate properly, check for open or short circuit in wire harness.

If the wire harness is good, replace the combination meter print board with a new one (page 19-12).

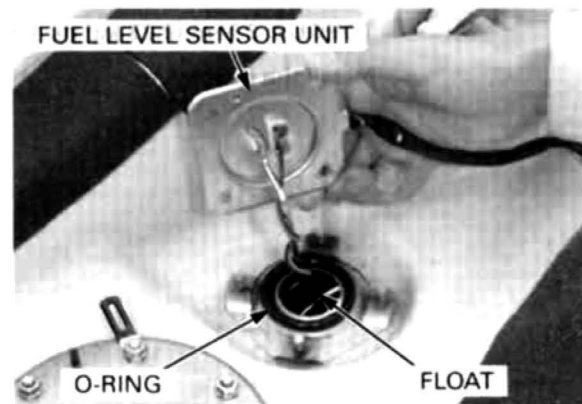


INSTALLATION

Check that the O-ring is in good condition and replace if necessary.

Install the fuel unit into the fuel tank.

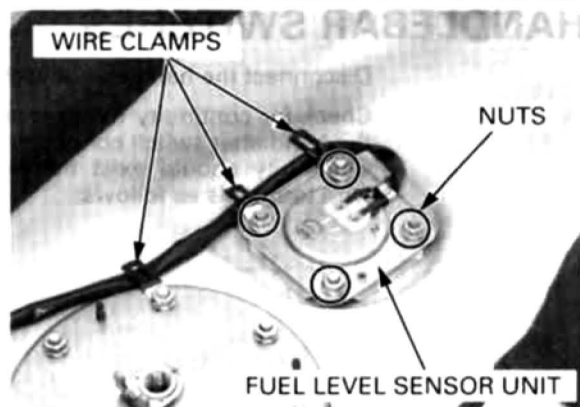
Be careful not to damage the float arm.



Install the wire clamps and nuts, then tighten the nuts securely

Clamp the fuel level sensor wire with wire clamps as shown.

Install the fuel tank (page 6-50).

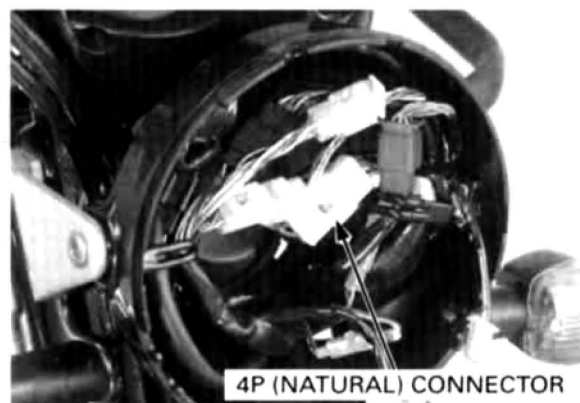


IGNITION SWITCH

INSPECTION

Remove the headlight case (page 19-6).

Disconnect the ignition switch wire 4P (Natural) connector.



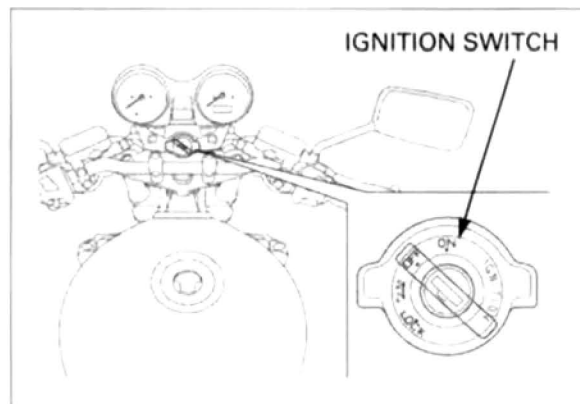
Check for continuity between the wire terminals of the ignition switch connector in each switch position.

Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

IGNITION SWITCH

	IG	BAT1
ON	○—○	
OFF		
LOCK		



REMOVAL/INSTALLATION

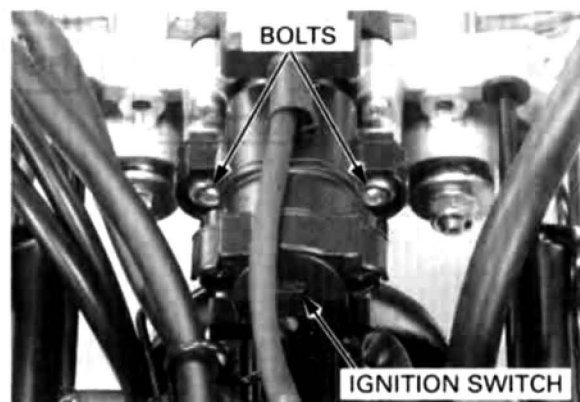
Remove the headlight case (page 19-7).

Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.

Tighten the ignition switch mounting bolt to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

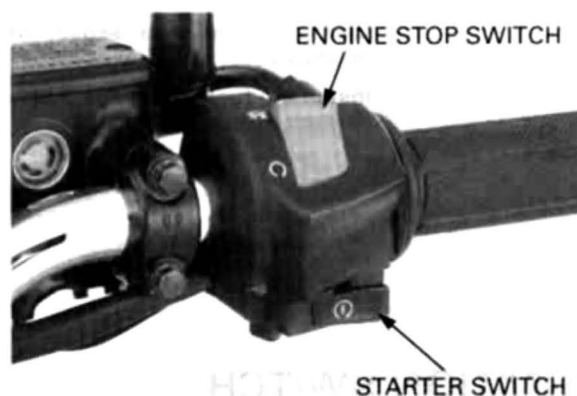


HANDLEBAR SWITCHES

Disconnect the handlebar switch connectors.

Check for continuity between the wire terminals of the handlebar switch connector.

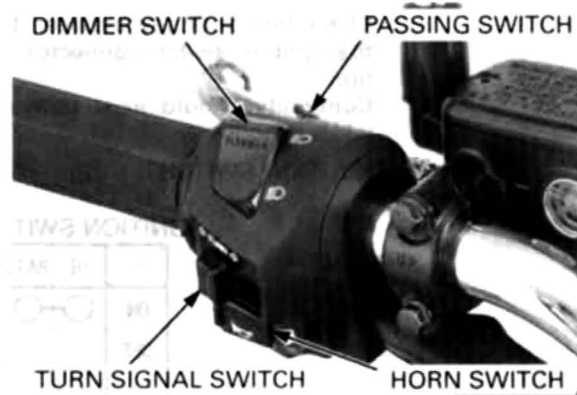
Continuity should exist between the color coded wire terminals as follows:



ENGINE STOP/STARTER SWITCH

	IG	BAT
OFF		
RUN	○—○	

	ST	IG	BAT4	HL
FREE			○—○	
PUSH	○—○			



TURN SIGNAL/PASSING/DIMMER/HORN SWITCH

	W	R	L
R	○—○		
N			
L	○—○		○—○

	BAT2	Hi
FREE		
PUSH	○—○	

	HL	Lo	Hi
Lo	○—○		
(N)	○—○	○—○	
Hi	○—○	○—○	○—○

	Ho	BAT3
FREE		
PUSH	○—○	

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

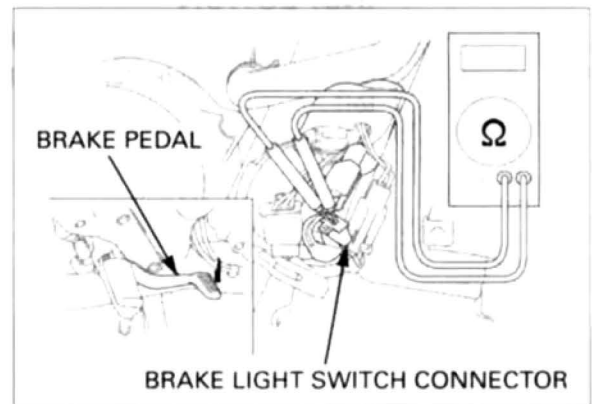


REAR

Remove the right side cover (page 3-4).

Disconnect the rear brake light switch 2P connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.

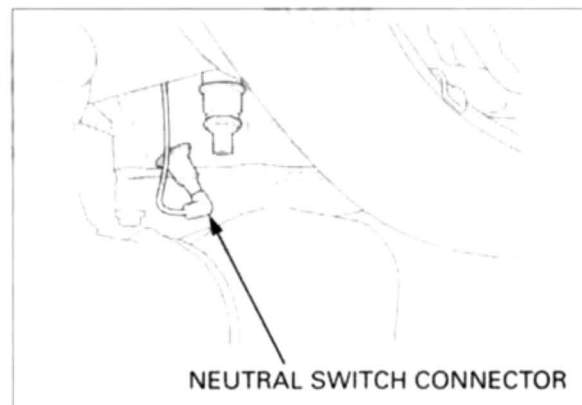


NEUTRAL SWITCH

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the Light green wire terminal and ground.

There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



SIDE STAND SWITCH

INSPECTION

Remove the left side cover (page 3-4).

Disconnect the side stand switch 3P (Green) connector.



Check for continuity between the wire terminals of the side stand switch connector. Continuity should exist only when the side stand is UP.

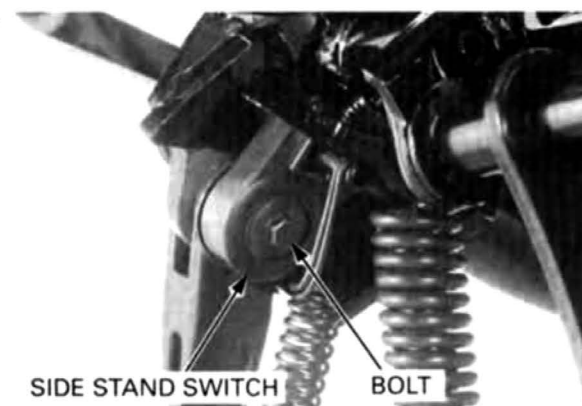


The center stand is optional equipment for this motorcycle

REMOVAL

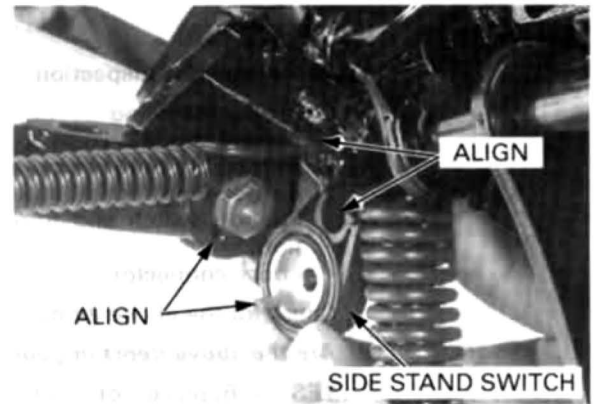
Disconnect the side stand switch 3P (Green) connector.

Remove the bolt and side stand switch.



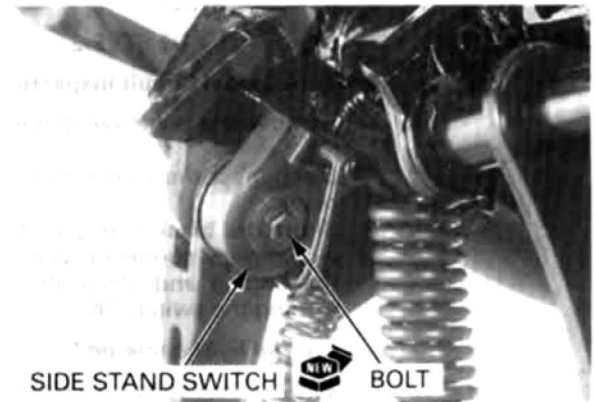
INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.

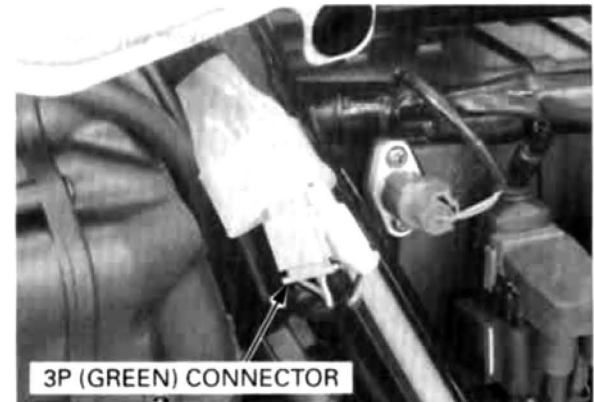


Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)



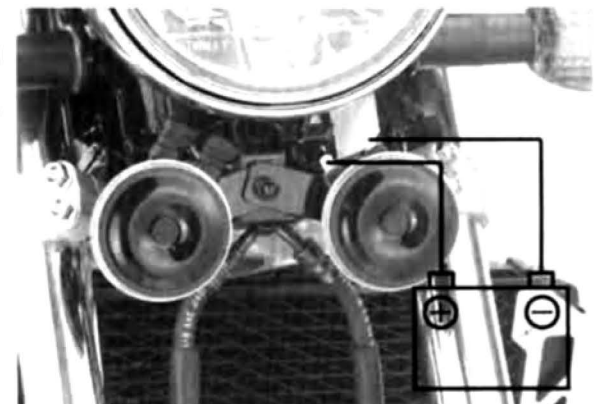
Connect the side stand switch 3P (Green) connector.

**HORN**

Disconnect the wire connectors from the horn.

Connect the 12V battery to the horn terminal directly.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



TURN SIGNAL RELAY

INSPECTION

1. Recommended Inspection

Check the following

- Battery condition
- Burned out bulb or non-specified wattage
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connector

Check for the above items.

Are the above items in good condition?

YES - Replace or repair the malfunction part(s)

NO - GO TO STEP 2.

2. Turn Signal Circuit Inspection

Remove the rear cowl (page 3-5).

Disconnect the turn signal connectors from the relay.

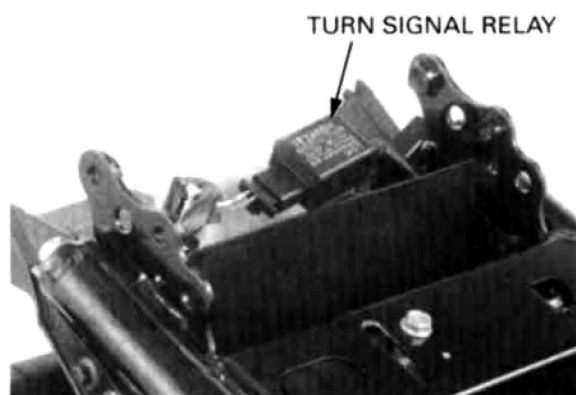
Short the black and gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.

Did the light come on?

YES -

- Faulty turn signal relay
- Poor connection of the connector.

NO - Broken wire harness



20. IMMOBILIZER SYSTEM (HISS)

SYSTEM DIAGRAM.....	20-2	TROUBLESHOOTING.....	20-9
SERVICE INFORMATION	20-3	IMMOBILIZER INDICATOR	20-11
KEY REGISTRATION PROCEDURES	20-4	ENGINE CONTROL MODULE (ECM).....	20-11
DIAGNOSTIC CODE INDICATION	20-7	IMMOBILIZER RECEIVER.....	20-12

SYSTEM DIAGRAM

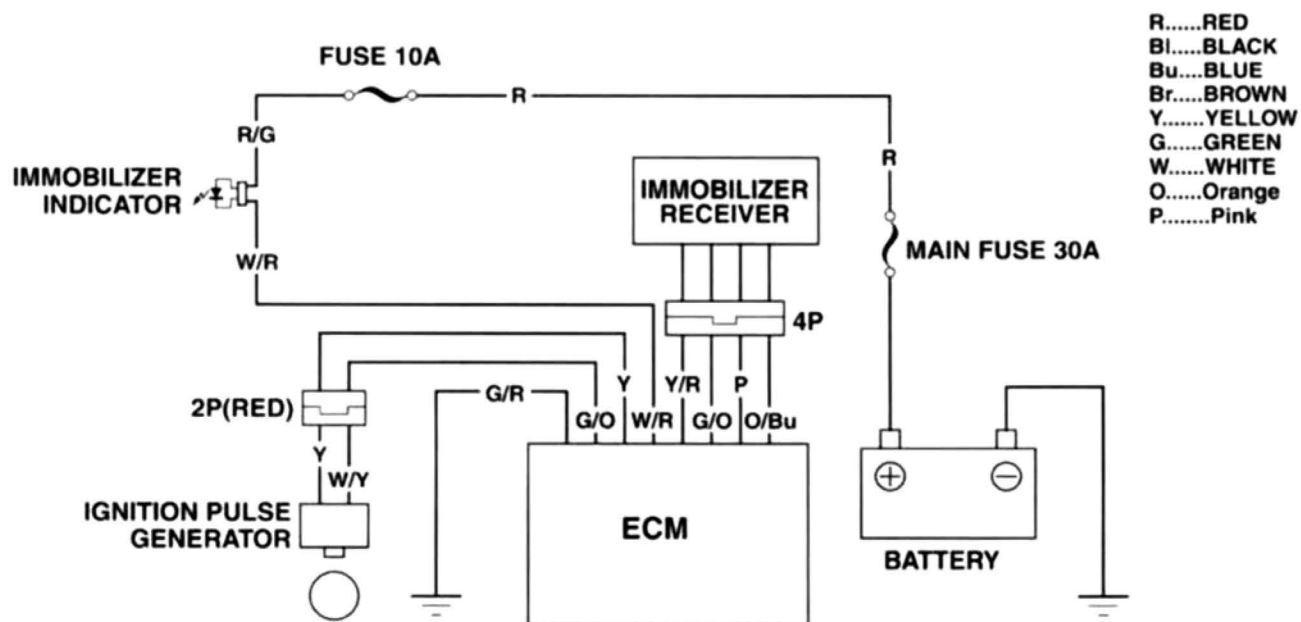
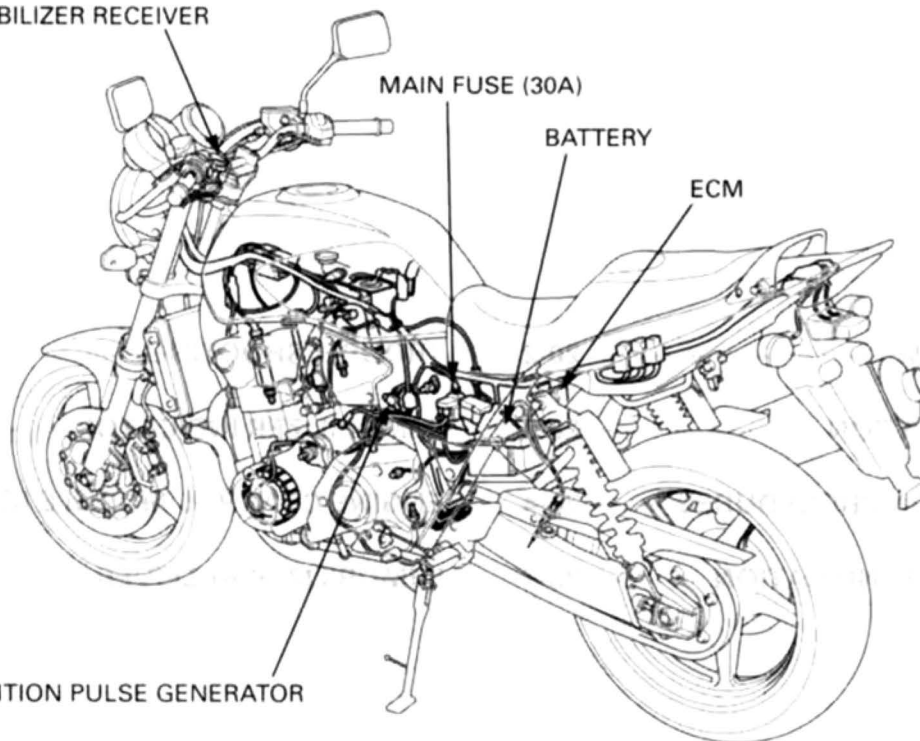
IGNITION SWITCH
IMMOBILIZER RECEIVER

MAIN FUSE (30A)

BATTERY

ECM

IGNITION PULSE GENERATOR



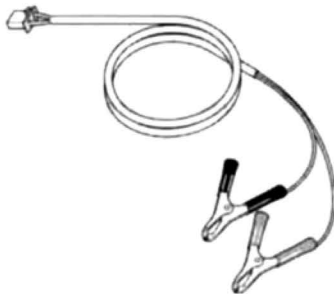
SERVICE INFORMATION

GENERAL

- HISS is the abbreviation of Honda Ignition Security System.
- When checking the immobilizer system (HISS), follow the steps in the troubleshooting flow chart (page 20-4).
- Keep the immobilizer key away from the other vehicle's immobilizer key when using it. The jamming of the key code signal may occur and the proper operation of the system will be obstructed.
- The key has built-in electronic part (transponder). Do not drop and strike the key against a hard material object, and do not leave the key on the dashboard in the car, etc. where the temperature will rise. Do not leave the key in the water for a prolonged time such as by washing the clothes.
- The engine control module (ECM) as well as the transponder keys must be replaced if all transponder keys have been lost.
- The system does not function with a duplicated key code is registered into the transponder with the immobilizer system (HISS).
- The ECM can store up to four key codes. (The four keys can be registered.)
- Do not modify the immobilizer system as it can cause the system failure. (The engine cannot be started.)
- Refer to the ignition system inspection (page 17-5).
- Refer to the ignition switch servicing (page 19-23).

TOOL

Inspection adaptor
07XMZ-MBW0101



KEY REGISTRATION PROCEDURES

When the key has been lost, or additional spare key is required:

1. Obtain a new transponder key.
2. Grind the key in accordance with the shape of the original key.
3. Apply 12 V battery voltage to the ignition pulse generator lines of the Engine Control Module (ECM) using the special tool (page 20-7).
4. Turn the ignition switch ON with the original key. The immobilizer indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
5. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds, then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key inserted in the ignition switch are cancelled. (Registration of the lost key or spare key is cancelled.)
The spare key must be registered again.
6. Turn the ignition switch OFF and remove the key.
 7. Turn the ignition switch ON with a new key or the spare key. (Never use the key registered in previous steps.) The indicator comes on for two seconds then it blinks four times repeatedly.



- The new key or spare key is registered in the ECM.
- If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-8).

NOTICE

Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

8. Repeat the steps 6 and 7 when you continuously register the other new key.
The ECM can store up to four key codes. (The four keys can be registered.)
9. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
10. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
11. Check that the engine can be started using all registered key.

When the ignition switch is faulty:

1. Obtain a new ignition switch and two new transponder key.
2. Remove the ignition switch (page 19-23).
3. Apply 12 V battery voltage to the ignition pulse generator lines of the Engine Control Module (ECM) using the special tool (page 20-7).
4. Set the original (registered) key near the immobilizer receiver so that the transponder in the key can communicate with the receiver.
5. Connect a new ignition switch to the wire harness and turn it ON with a new transponder key. (keep the ignition switch away from the receiver.) The immobilizer indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
6. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key set near the receiver are cancelled.
7. Turn the ignition switch OFF and remove the key.
 8. Install the ignition switch onto the top bridge (page 19-23).
 9. Turn the ignition switch ON with a first new key. The indicator comes on for two seconds then it blinks four times repeatedly.



- The first key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-8).
10. Turn the ignition switch OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.
 11. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on for two seconds then it goes off.
 - The immobilizer system (HISS) returns to the normal mode.
 12. Turn the ignition switch OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.
 13. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on and it remains on.
 - The code if the first key is recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
 14. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.
 - The immobilizer system (HISS) enters the registration mode. Registration of the original key used in step 4 is cancelled.

IMMOBILIZER SYSTEM (HISS)

15. Turn the ignition switch OFF and remove the key.
16. Turn the ignition switch ON with a second new key. (Never use the key registered in previous step.) The indicator comes on for two seconds then it blinks four times repeatedly.
 - The second key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-8).

NOTICE

Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

17. Repeat the steps 15 and 16 when you continuously register the other new key.

The ECM can store up to four key codes. (The four keys can be registered.)
18. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
19. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
20. Check that the engine can be started using all registered key.

When all keys have been lost, or the Engine Control Module (ECM) is faulty

1. Obtain a new ECM and two new transponder keys.
2. Grind the keys in accordance with the shape of the original key (or use the key number plate when all key have been lost).
3. Replace the ECM with a new one.
4. Turn the ignition switch ON with a first new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The first key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-8).
5. Turn the ignition switch OFF and remove the first key.
6. Turn the ignition switch ON with a second new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The second key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
7. Turn the ignition switch OFF and remove the second key.
 - The system (ECM) will not enter the normal mode unless the two keys are registered in ECM.
 - The third new key cannot be continuously registered. When it is necessary to register the third key, follow the procedures "When the key has been lost, or additional key is required" (page 20-4).
8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Remove the right side cover (page 3-4).

Disconnect the ignition pulse generator 2P (Red) connector.

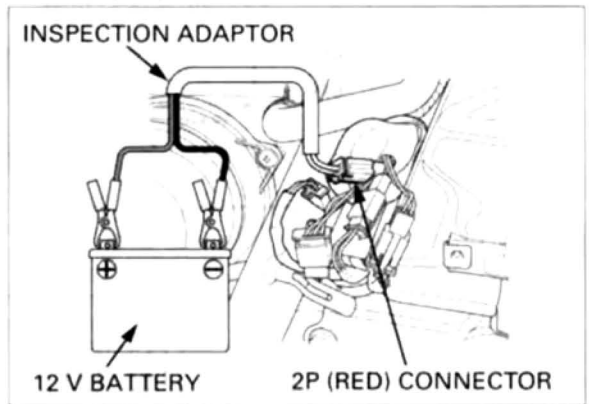
Connect the inspection adaptor to the wire harness side connector.

Connect the Red clip of the adaptor to the 12V battery positive (+) terminal and green clip to the negative (-) terminal.

TOOL:

Inspection adaptor

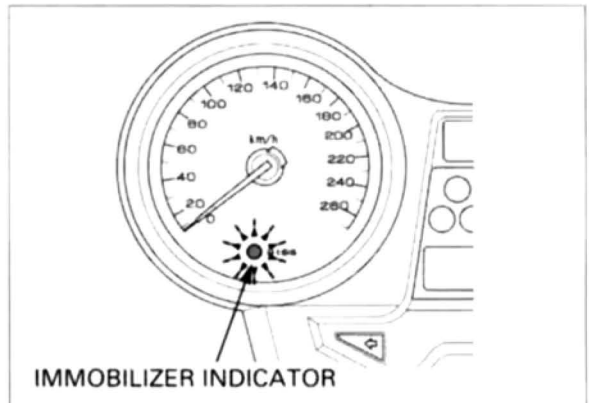
07XMZ-MBW0101



Turn the ignition switch ON with the properly registered key.

The immobilizer indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal. The blinking frequency is repeated.

The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)



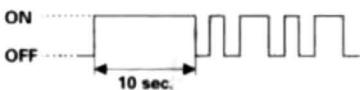


DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
<p>ON ... OFF</p> <p>10 sec.</p>	ECM data is abnormal	Faulty ECM	Replace the ECM
	Code signals cannot send or receive	Faulty receiver or wire harness	Follow the troubleshooting (page 20-9)
	Identification code is disagree	Jamming by the other transponder	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in)
	Secret code is disagree		

IMMOBILIZER SYSTEM (HISS)

When the system (ECM) enters the diagnostic mode from the registration mode: **20-8**

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	Registration is overlapped	The key is already registered properly	Use a new key or cancelled key
	Code signals cannot send or receive	Communication fails	Follow the trouble-shooting (page 20-9)
	Registration is impossible	The key is already registered on the other system	Use a new key

TROUBLESHOOTING

The immobilizer indicator comes on for approx. two seconds then it goes off, when the ignition switch is turned ON with the properly registered key and the immobilizer system (HISS) functions normally. If there is any problem or the properly registered key is not used, the indicator will remain on.

Immobilizer indicator does not come on when the ignition switch is turned ON

1. Fuse Inspection

Check for blown fuse (10 A).

Did the fuse blow?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Combination Meter Inspection

Check that the oil pressure and neutral indicator lights come on with the ignition switch ON.

Is there indicator come on?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Combination Meter Power Input line Inspection

Check the power input line (black/brown wire) at the combination meter connector (page 19-15).

Is the voltage specified?

NO – Open circuit in Black/Brown wire

YES – Faulty combination meter

4. Immobilizer Indicator Line Inspection At The ECM Connector

Check the immobilizer indicator line (White/Red wire) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified?

NO – GO TO STEP 5.

YES – GO TO STEP 6.

5. Immobilizer Indicator Line Inspection At The Combination Meter Connector

Check the immobilizer indicator line (White/Red wire) at the combination meter connector (page 20-11).

Is the voltage specified?

NO – Open circuit in White/Red wire

YES – Faulty combination meter

6. Power Input Line Inspection At The ECM Connector

Check the power input line (Black wire) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified?

NO – Open circuit in Black wire

YES – GO TO STEP 7.

7. Ground Line Inspection At The ECM Connector

Check the ground line (Green wire) at the combination meter connector (page 20-12).

Is there continuity?

NO – Open circuit in Green wire

YES –

- Loose or poor ECM connector contact
- Faulty ECM

Immobilizer indicator does not come on when the ignition switch is turned ON

1. Fuse Inspection

Check for blown fuse (10 A).

Did the fuse blow?

YES – Replace the fuse

NO – GO TO STEP 2.

2. First Transponder Key Inspection

Turn the ignition switch ON with the spare transponder key and check the immobilizer indicator. The indicator should come on for 2 seconds then go off.

Is there indicator go off?

YES – Faulty first transponder key

NO – GO TO STEP 3.

3. Diagnostic Code Inspection

Perform the diagnostic code indication procedure (page 20-7) and check that the immobilizer indicator comes on then it starts blinking.

Is there indicator Brinks or Stay Lit?

BRINKS–Read the diagnostic code (page 20-7).

STAY LIT–GO TO STEP 4.

4. Immobilizer Indicator Line Inspection At The ECM Connector

Check the immobilizer indicator line (White/Red wire) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified?

NO – Short circuit in White/Red wire

YES – GO TO STEP 5.

5. Ignition Pulse Generator Line Inspection

Check the ignition pulse generator lines (Yellow and White/Yellow wires) between the ECM and ignition pulse generator connectors (page 20-12).

Is there Continuity?

YES – • Open circuit in Yellow wire
• Open circuit in White/Yellow wire

NO – Faulty ECM

Diagnostic code  is indicated (Code signals cannot send or receive)

1. Immobilizer Receiver Power Input Line Inspection

Check the power input line at the immobilizer receiver connector (page 20-12).

Is there approx. 5V?

NO – Open or short circuit in Yellow/Red wire

YES – GO TO STEP 2.

2. Immobilizer Receiver Ground Line Inspection

Check the ground at the immobilizer receiver connector (page 20-12).

Is there continuity?

NO – Open or short circuit in Green/Orange wire

YES – GO TO STEP 3.

3. Immobilizer Receiver Signal Line Inspection

Check the signal line between the immobilizer receiver and ECM connector (page 20-13).

Is there continuity?

NO – • Open or short circuit in Pink wire
• Open or short circuit in Orange/Blue wire

YES – Faulty immobilizer receiver

IMMOBILIZER INDICATOR

Remove the headlight unit (page 19-6).

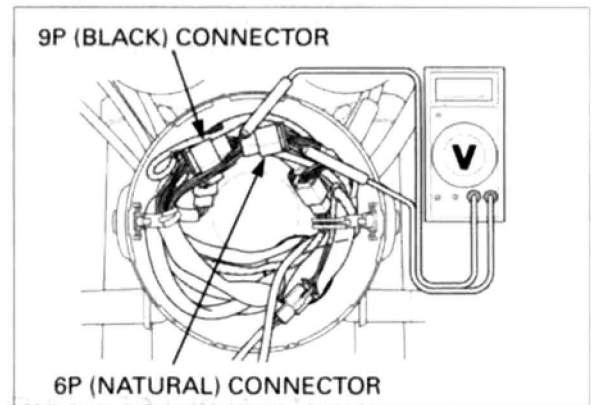
Perform the following inspections with the combination meter 9P (Black) and 6P (Natural) connector connected.

POWER INPUT LINE INSPECTION

Measure the voltage between the Black/Brown (+) and Green (-) wire terminals.

Turn the ignition switch ON.

There should be battery voltage.



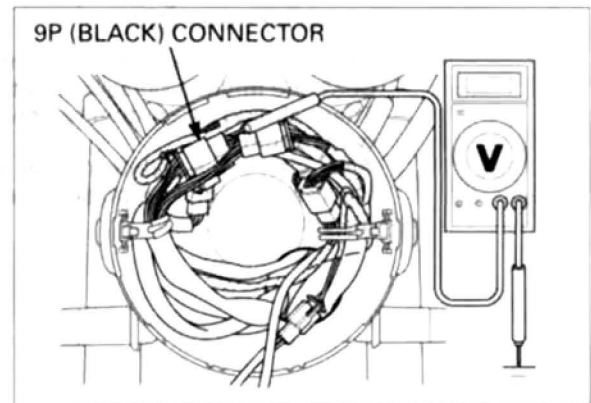
IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the White/Red (+) and ground(-).

Turn the ignition switch ON.

There should be battery voltage.

There should be no voltage for approx. two seconds after the ignition switch is turned ON, then the battery voltage should appear, if the system is normal.



ENGINE CONTROL MODULE (ECM)

Remove the battery cover (page 16-5).

Disconnect the ECM 32P multi-connectors.

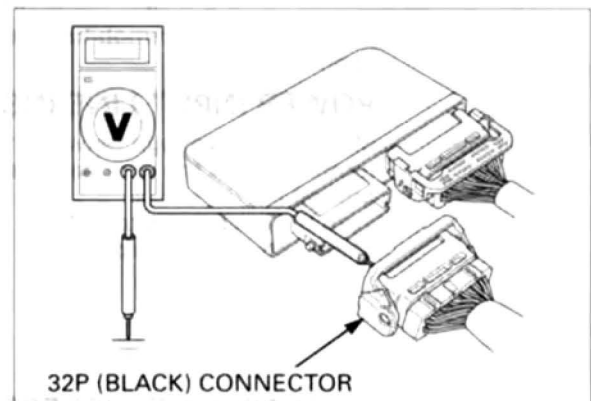
Perform the following inspections at the wire harness side connector of the ECM.

IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the White/Red wire terminal (+) and ground (-).

Turn the ignition switch ON.

There should be battery voltage.

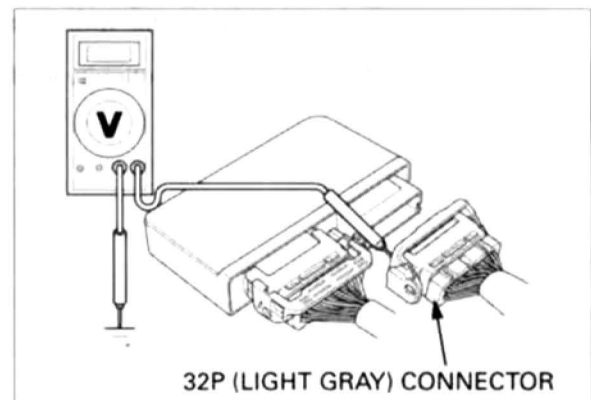


POWER INPUT LINE INSPECTION

Measure the voltage between the Black/White wire terminal (+) and ground (-).

Turn the ignition switch ON.

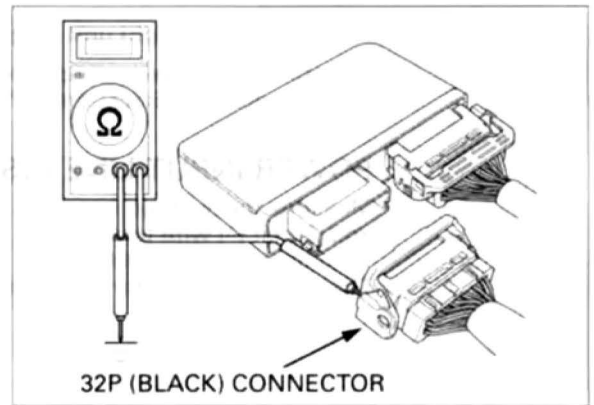
There should be battery voltage.



IMMOBILIZER SYSTEM (HISS)

GROUND LINE INSPECTION

Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.

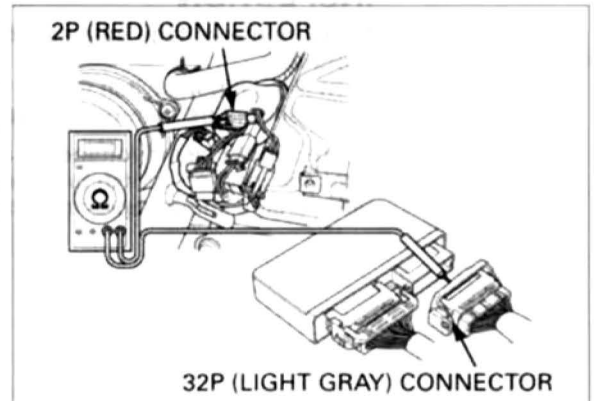


IGNITION PULSE GENERATOR LINE INSPECTION

Disconnect the ignition pulse generator 2P (Red) connector (page 20-7).

Check the Yellow wire for continuity between the ECM and ignition pulse generator connector.
There should be continuity between the same color wire terminals.

Also check the White/Yellow wire for continuity between the ignition pulse generator connector and ground.



IMMOBILIZER RECEIVER

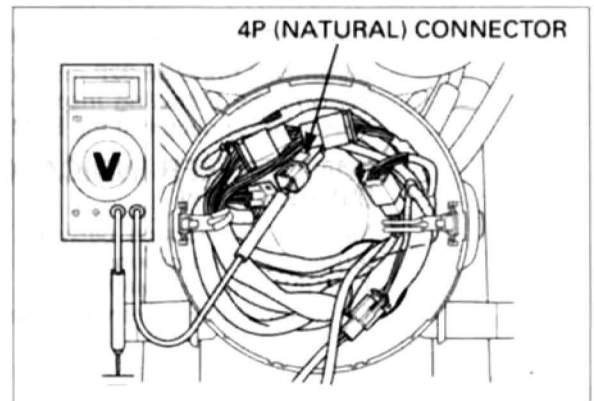
Remove the headlight unit (page 19-6).

Disconnect the immobilizer receiver 4P (Natural) connector.

POWER INPUT LINE INSPECTION

Measure the voltage between the Yellow/Red wire terminal (+) of the wire harness side connector and ground (-).

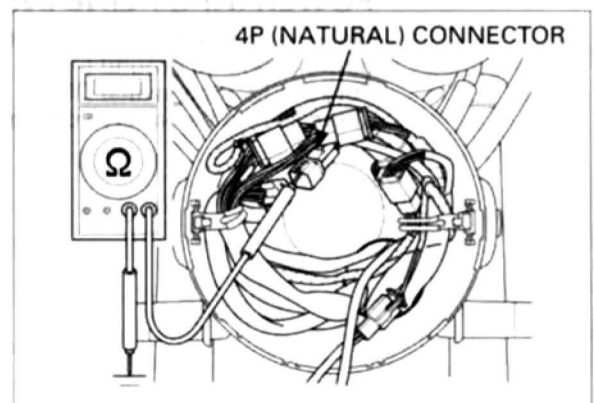
Turn the ignition switch ON.
There should be approx. 5 V.



GROUND LINE INSPECTION

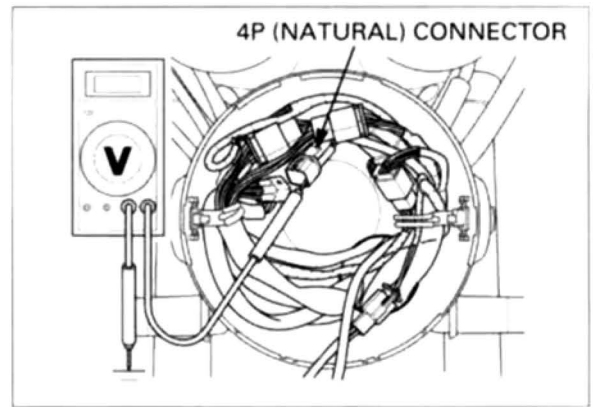
Check for continuity between the Green/Orange wire terminal of the wire harness side connector and ground.

There should be continuity at all times.



SIGNAL LINE INSPECTION

Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.

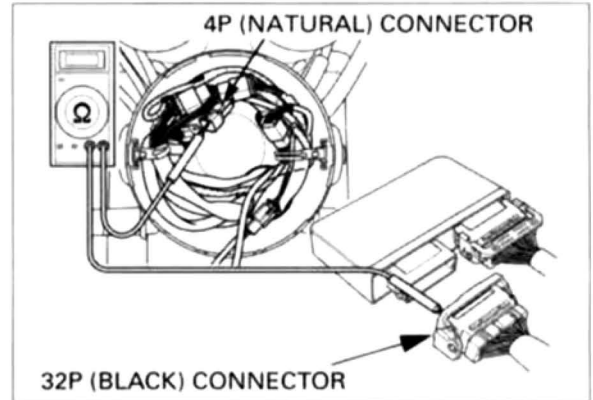


Remove the battery cover (page 16-5).

Disconnect the engine control module (ECM) connector.

Check the Orange/Blue wire for continuity between the immobilizer receiver and ECM connectors.
There should be continuity.

Check for continuity between the Orange/Blue wire terminal and ground.
There should be no continuity.



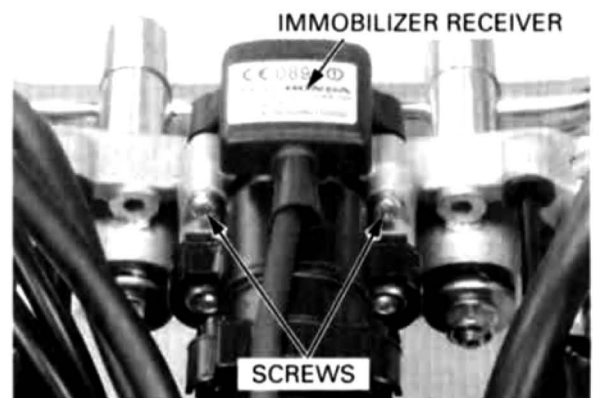
REPLACEMENT

Remove the combination meter (page 19-11).

Remove the two screws and the immobilizer receiver.

Install a new receiver and tighten the two screws.
Route the receiver wire properly (page 1-23).

Install the removed parts in the reverse order of removal.

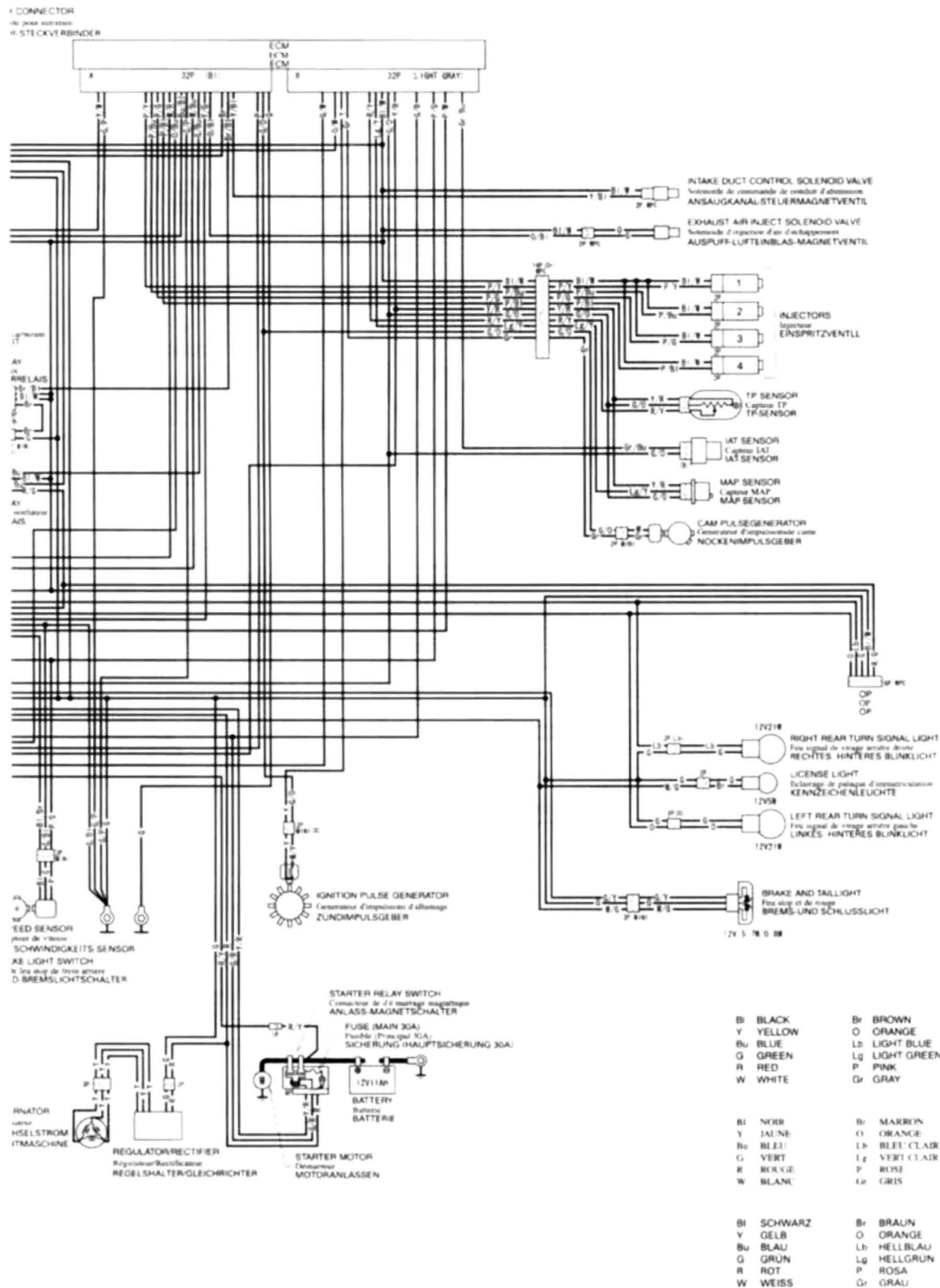


REPLACEMENT PARTS FOR PROBLEM

Problem	Replacement parts				
	Transponder Key	Immobilizer receiver	ECM	Ignition switch	*Accessory lock and key
One Key has been lose, or additional spare key is required	○				
All key have been lost, or ECM is faulty	○		○		
Immobilizer receiver is faulty		○			
Ignition switch is faulty	○			○	
*Accessory lock is faulty					○

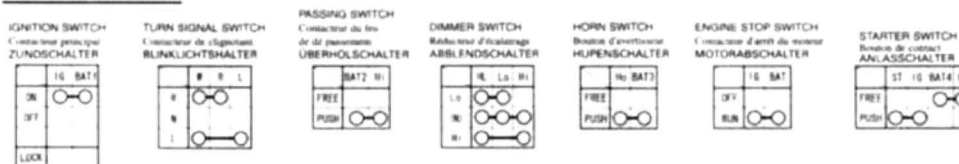
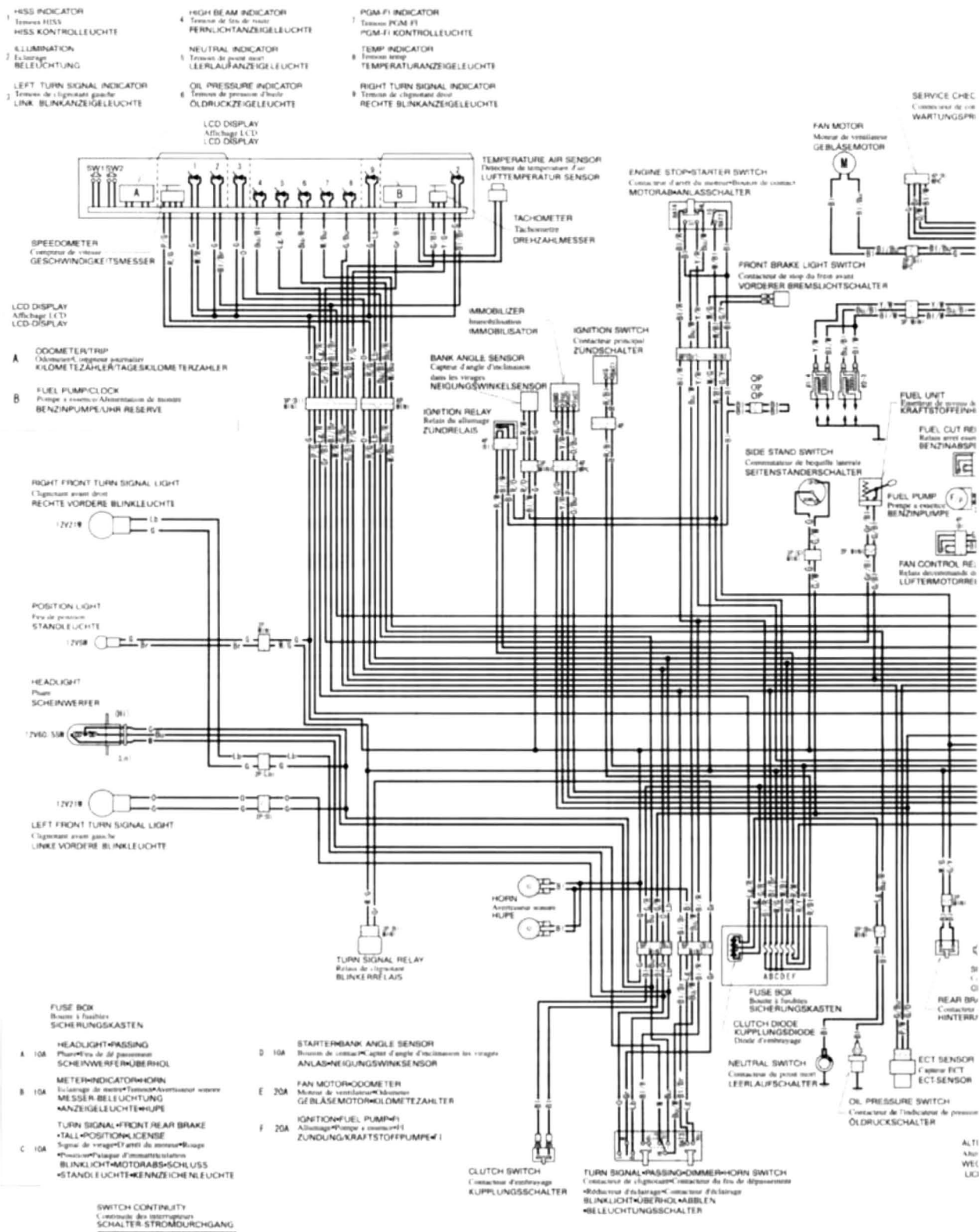
*Accessory lock means the seat lock, fuel fill cap or helmet holder.

ED type (English, French, Germany):	21-3	U type:.....	21-5
ED type (Italian, Spanish, Dutch):.....	21-4		



0030Z-MEJ-6400

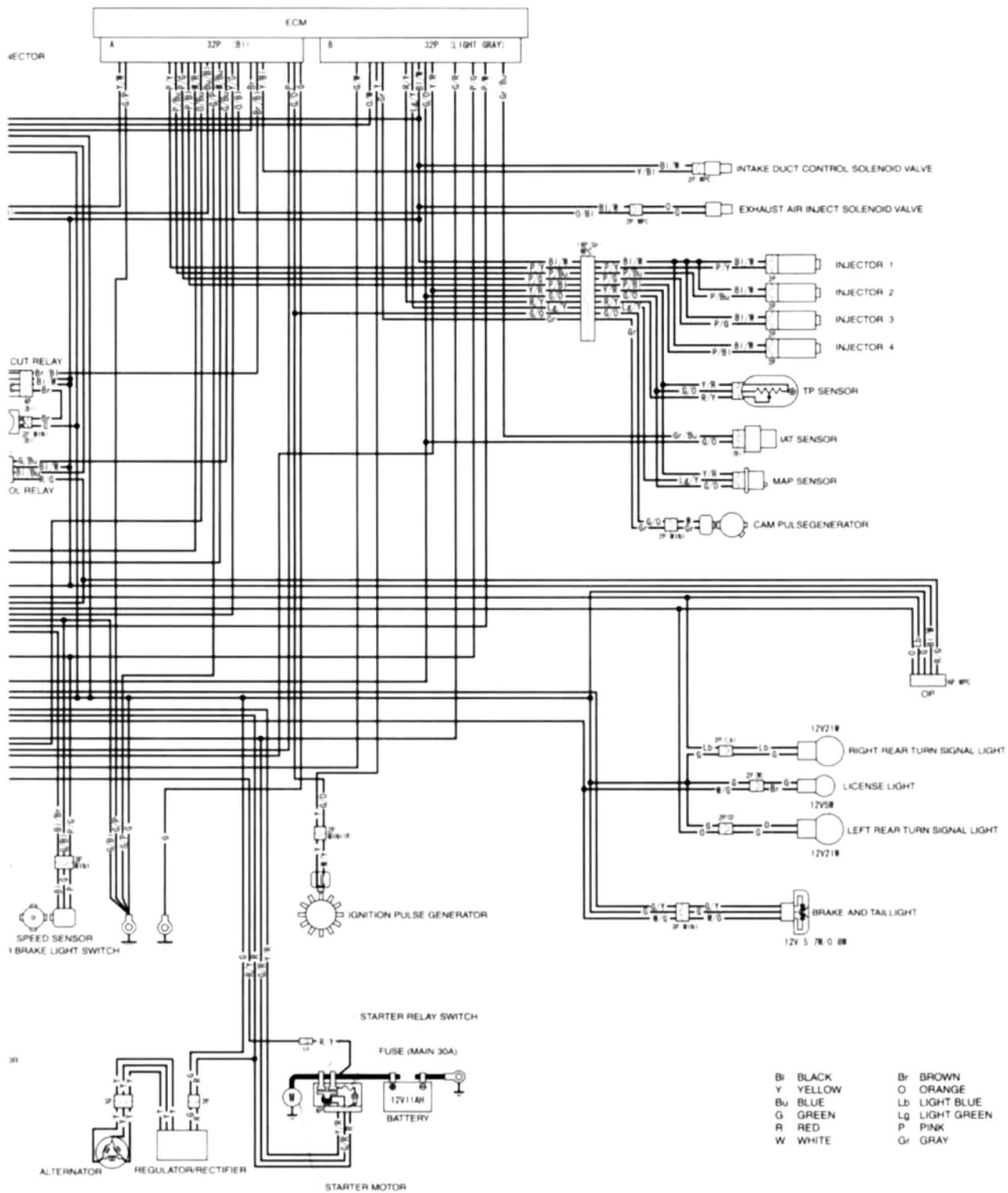
ED type (English, French, Germany):



ED type (Italian, Spanish, Dutch):



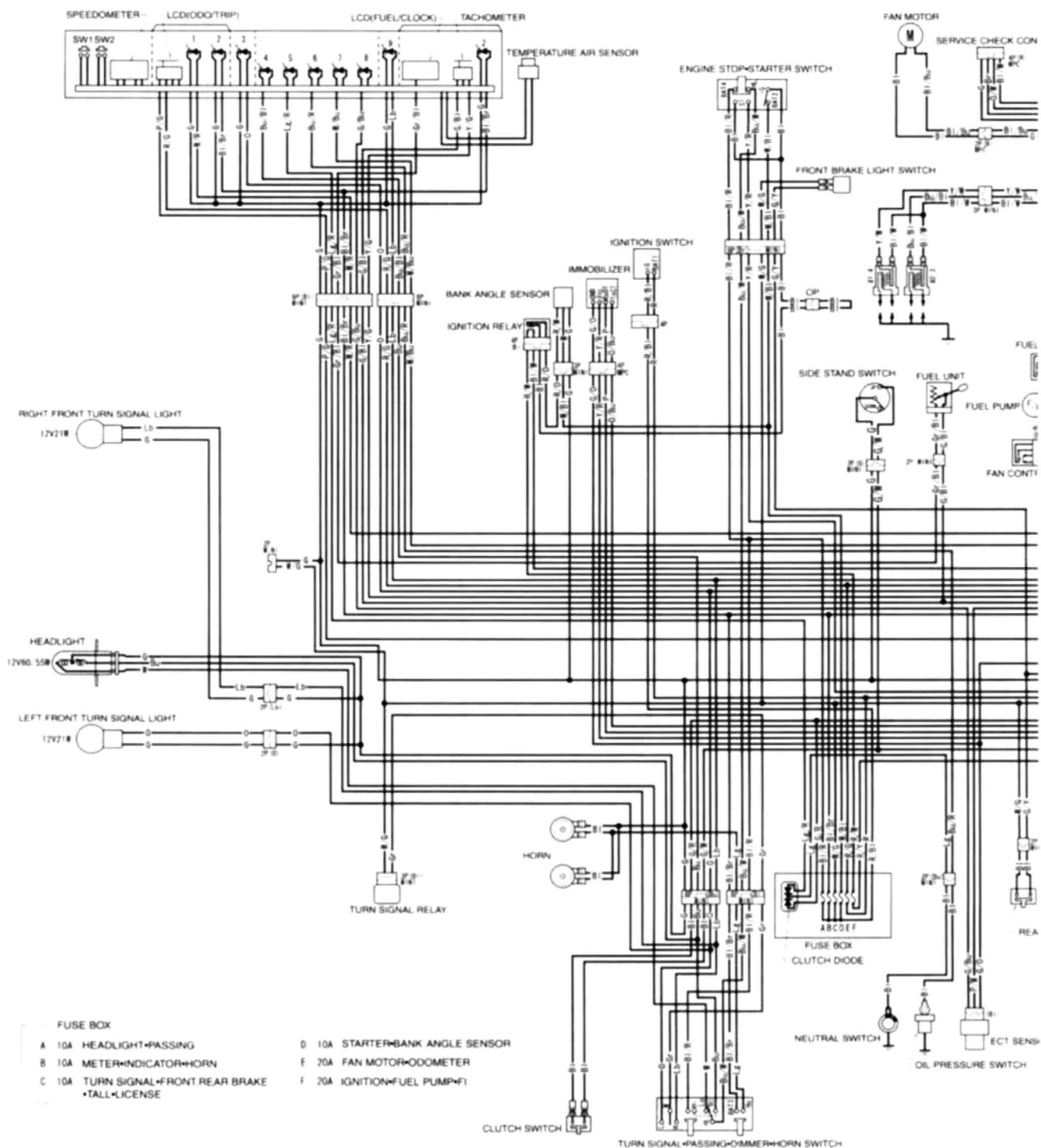
0030Z-MEJ-6400



0030Z-MEJ-6500

U type:

- | | | |
|------------------------------|--------------------------|-------------------------------|
| 1 HISS INDICATOR | 4 HIGH BEAM INDICATOR | 7 PGM-FI INDICATOR |
| 2 ILLUMINATION | 5 NEUTRAL INDICATOR | 8 TEMP INDICATOR |
| 3 LEFT TURN SIGNAL INDICATOR | 6 OIL PRESSURE INDICATOR | 9 RIGHT TURN SIGNAL INDICATOR |



ENGINE DOES NOT START OR IS HARD TO START	22-2	POOR PERFORMANCE AT LOW AND IDLE SPEED	22-5
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ENGINE DOES NOT START OR IS HARD TO START

1. Spark Plug Inspection

Remove and inspect spark plug.

Are there spark plugs in good condition?

- NO** – • Incorrect spark plug heat range
• Incorrect spark plug gap
• Dirty air cleaner

YES – GO TO STEP 2.

2. Spark Test

Perform spark test.

Are there good sparks?

- NO** – • Faulty spark plug
• Loose or disconnected ignition system wires
• Faulty ignition coil
• Broken or shorted spark plug wire
• Faulty ignition pulse generator
• Faulty engine stop switch
• Faulty PGM-FI IGNITION relay
• Faulty engine control module (ECM)

YES – GO TO STEP 3.

3. Programmed Fuel Injection System Inspection

Check the fuel injection system.

Is the fuel injection system normal?

- NO** – Faulty fuel injection system (page 6-67).

YES – GO TO STEP 4.

4. Cylinder compression Inspection

Test the cylinder compression.

Is the compression specified?

- NO** – • Valve stuck open
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Seized valve
• Improper valve timing

YES – GO TO STEP 5.

5. Engine Start Condition

Start by following normal procedure.

Did the engine start but stop?

- Yes** – • Leaking intake manifold gasket
• Faulty idle air control valve
• Improper ignition timing (Faulty ECM or ignition pulse generator)
• Contaminated fuel

ENGINE LACKS POWER

1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

Did the wheel spin freely?

- NO** – • Brake dragging
• Worn or damaged wheel bearings
• Dirty air cleaner

YES – GO TO STEP 2.

2. Tire Pressure Inspection

Check the tire pressure.

Are there tire pressure correct?

- NO** – • Faulty tire valve
• Punctured tire

YES – GO TO STEP 3.

3. Clutch Inspection

Accelerate rapidly low to second.

Did the engine speed change accordingly when clutch is released?

- NO** – • Clutch slipping
• Worn clutch discs/plates
• Warped clutch discs/plates
• Weak clutch spring
• Faulty hydraulic assist system
• Additive in engine oil

YES – GO TO STEP 4.

4. Engine Performance Inspection

Accelerate lightly.

Did the Engine speed increase?

- NO** – • Clogged air cleaner
• Restricted fuel flow
• Clogged muffler

YES – GO TO STEP 5.

5. Spark Plug Inspection

Remove and inspect spark plug.

Are there spark plugs in good condition?

- NO** – • Plugs not serviced frequently enough
• Incorrect spark plug heat range
• Incorrect spark plug gap

YES – GO TO STEP 6.

6. Engine Oil Inspection

Check the oil level and condition.

Is the engine oil good condition?

- NO** – • Oil level too high
• Oil level too low
• Contaminated oil

YES – GO TO STEP 7.

7. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing specified?

- NO** – • Faulty engine control module (ECM)
• Faulty ignition pulse generator
• Improper valve timing

YES – GO TO STEP 8.

8. Cylinder compression Inspection

Test the cylinder compression.

Is the compression specified?

- NO** – • Valve clearance too small
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Improper valve timing

YES – GO TO STEP 9.

9. Programmed Fuel Injection System Inspection

Check the fuel injection system.

Is the fuel injection system normally?

- NO** – Faulty fuel injection system (page 6-67).

YES – GO TO STEP 10.

10. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

Is the Valve train lubricated properly?

- NO** – • Faulty engine control module (ECM)
• Faulty ignition pulse generator
• Improper valve timing

YES – GO TO STEP 11.

11. Over Heating Inspection

Check for engine over heating.

Is the engine over heating?

- YES** – • Coolant level too low
• Fan motor not working (Faulty fan motor relay)
• Thermostat stuck closed
• Excessive carbon build-up in combustion chamber
• Use of poor quality fuel
• Use of poor quality fuel
• Clutch slipping

NO – GO TO STEP 12.

12. Engine Knocking Inspection

Accelerate or run at high speed.

Is the engine knocking?

- YES** – • Worn piston and cylinder
• Wrong type of fuel
• Thermostat stuck closed
• Excessive carbon build-up in combustion chamber
• Ignition timing too advance (Faulty ECM)

NO – • Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Spark Plug Inspection

Remove and inspect spark plug.

Are there spark plugs in good condition?

- NO** – • Plugs not serviced frequently enough
• Incorrect spark plug heat range
• Incorrect spark plug gap

YES – GO TO STEP 2.

2. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing specified?

- NO** – • Faulty engine control module (ECM)
• Faulty ignition pulse generator
• Improper valve timing

YES – GO TO STEP 3.

3. Programmed Fuel Injection System Inspection

Check the fuel injection system.

Is the fuel injection system normally?

- NO** – Faulty fuel injection system (page 6-67).

YES – GO TO STEP 4.

4. Starter Valve Synchronization Inspection

Check the starter valve synchronization.

Is the starter valve synchronization specified?

- NO** – Adjust the starter valve synchronization (page 6-73).

YES – GO TO STEP 5.

5. Intake Pipe Leaking Inspection

Check for leaks intake manifold pipe.

Is there leaking?

- YES** – • Loose insulator
• Damaged insulator

POOR PERFORMANCE AT HIGH SPEED

1. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing specified?

- NO** – • Faulty engine control module (ECM)
• Faulty ignition pulse generator
• Improper valve timing

YES – GO TO STEP 2.

2. Programmed Fuel Injection System Inspection

Check the fuel injection system.

Is the fuel injection system normally?

- NO** – Faulty fuel injection system (page 6-67).

YES – GO TO STEP 3.

3. Valve Timing Inspection

Check the valve timing.

Did the valve timing correct?

- NO** – Camshafts not installed properly

YES – GO TO STEP 4.

4. Valve Spring Inspection

Check for the valve springs.

Is the valve spring free length as specified?

- NO** – Faulty valve spring

YES – Not weak

POOR HANDLING

Steering is heavy

- Steering bearing adjustment nut too tight
- Damaged steering head bearings

Either wheel is wobbling

- Excessive wheel bearing play
- Bent rim
- Improper installed wheel hub
- Swingarm pivot bearing excessively worn
- Bent frame

The motorcycle pulled to one side

- Front and rear wheel not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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